FLIGHT and AIRCRAFT ENGINEER

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The Outlook

A Year's Progress

CLOSE upon twelve months have elapsed since the doors closed for the last time upon the annual display held at Radlett by the Society of British Aircraft Constructors. That display was by general consent counted a great success, and there is no doubt that it contributed in large measure to the very creditable export business which the British aircraft industry has since achieved.

There is good reason to hope that this year's display, which opens at Farnborough next Tuesday, will eclipse in some ways last year's success. So far as the flying displays are concerned, much depends upon the weather, but this is the one item for which the S.B.A.C. cannot legislate. In every other respect, no effort has been spared to ensure that our foreign visitors shall see the very best which the British aircraft industry has to offer; and a very good best it is.

Significant, in the aircraft field, is the fact that out of rather more than 60 aircraft, some 20 are powered by either turbojets or turboprops. That nearly one-third of the machines on view should have the latest types of powerplant is an indication of the seriousness with which Great Britain has attacked the many problems associated with this new form of prime mover. As well as seeing them in action, visitors will be able to study many of them in detail on the stands in the "static" exhibition. It is no small achievement that three of these new power plants should have completed endurance runs of an extremely arduous nature, a fact which promises well for their reliability in actual service.

While great interest will attach to jet and turbine-engined aircraft (represented in the civil as well as military categories) because of their novelty and undoubted future, orthodoxy has not been neglected, and visitors whose interests demand less advanced equipment will find a wide range of piston-engined aircraft, from small private-owner types to the large four-engined transports.

Evidence of excellent progress in the rotating-wing field will be forthcoming in the form of some half-dozen helicopters, not all of which will be finished in time to give flying displays, but one of which has the distinction of holding the world's speed record with 124.3 miles per hour. Another class of aircraft, not frequently seen at S.B.A.C. Displays, is the amphibian, of which two very different examples will be represented.

To Napoleon is ascribed the dictum that an army marches on its stomach. A modern version could truthfully state that an aircraft flies on its materials and equipment, and in the static exhibition, larger and better than ever, close upon 200 British firms will display the thousand-and-one items which go to the functioning of modern aircraft, and without which the best airframes and power plants in the world would be useless.

A Permanent Record

ALTHOUGH, fortunately, it has been found possible this year to admit the general public to the Farnborough Display on the last two days, an opportunity which thousands will undoubtedly welcome, there will be many, at home and abroad, who are unable to pay a personal visit. For their benefit, and to provide even those who can attend the display with a permanent record of many facts which could only be gleaned by spending a disproportionate amount of time on the task, we are publishing special features in the next three issues of *Flight*. This week descriptions are given of all British power units, piston engines as well as turbojets and turboprops. The descriptions and illustrations are supplemented by data tables from which essential information can be gleaned. Other tables relate to aircraft, military and civil, and cover every known current type. A perusal of these tables will reveal the excellent results achieved in such matters as performance and carrying capacity.

Next week's issue will contain illustrated descriptions

of the aircraft listed in this week's tables, not only those which are taking part in the Farnborough Display, but also others which, for various reasons, cannot be shown. This feature will thus cover the entire range of products of all British aircraft manufacturers.

Another section will review the whole of the ancillary industry, and its classification under different headings will facilitate reference to the specialist manufacturers of each particular class of product.

In the third issue, dated September 16th, staff writers, artists and photographers will record the various events in the flying displays, and describe outstanding novelties seen in the static exhibition. That issue will be profusely illustrated and will, in conjunction with the two previous issues, round out the picture of Britain's aircraft industry in 1948.

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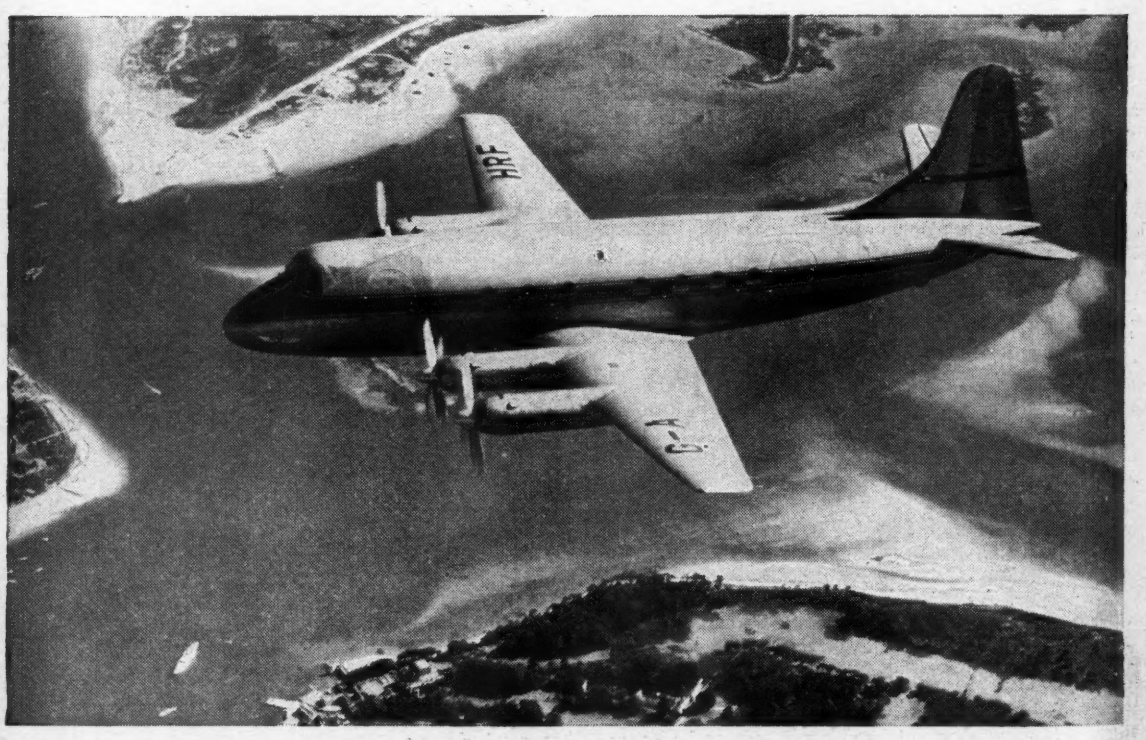
Forthcoming Events, page 282

To be Seen at Farnborough

LAST-minute surprises and disappointments, forecast in "Flight" last week, have modified the list of aircraft due to perform in the air or be exhibited on the ground at the S.B.A.C. Display. The tally which follows has been prepared from the latest information available at the moment of going to press. **Airspeed** : *Ambassador, Consul.* **Armstrong Siddeley** : *Python-Lancaster.* **Armstrong Whitworth** : *A.W.52* (2 *Nene*), *A.W.52* (2 *Derwent*). **Auster** : *Autocrat, Avis, T.Mk.1, A.2/45.* **Blackburn** : *S.28/43, Firebrand* 5. **Boulton Paul** : *Balliol* 1, *Balliol* 2. **Bristol** : *New Type* 170 (*Freighter XXIE*), *Brigand B.1, Type* 171 *Mk.* 2 *helicopter.* **Chrislea** : *Super Ace* (*uncertain*). **Cierva** : *Air Horse, Skeeter* (*unlikely to fly*). **de Havilland** : *Sea Hornet, Dove, Chipmunk, Vampire* 5, *High-Altitude Ghost-Vampire.* **Elliot of Newbury** : *Eon* (*Major X*), *Olympia, Baby and Primary Eon gliders.* **Fairey** : *Gyrodyn, Primer, Operational Trainer, Firefly, Mk.* 5. **General Aircraft** : *One type of tailless research glider, Mosquito target-tower.* **Gloster** : *Meteor* 4, *Meteor* 7, *E.1/44.* **Handley Page** : *Hastings I, Hermes IV, Miles Marathon.* **Hawker** : *P.1040, N.* 7/46, *Sea Fury.* **Napier** : *Naiad-Lincoln.* **Percival** : *Prince, Prentice* 1, *Prentice* 2. **Planet** : *Satellite.* **Portsmouth Aviation** : *Aerocar.* **A. V. Roe** : *Athena* 1, *Athena* 2, *Dart-Athena* (*possible*), *Tudor VIII, Shackleton* (*unlikely*), *Lincoln, Tudor IV, Tudor VII* (*possible*). **Rolls-Royce** : *Avon-Lancaster.* **Saunders-Roe** : *S.R./A1.* **Scottish Aviation** : *Prestwick Pioneer.* **Short** : *Sealand, Sturgeon* 2, *Solent.* **Vickers-Armstrongs** : *Nene-Viking, Viscount, Valetta.* **Vickers-Supermarine** : *Attacker, Seagull, Spitfire Trainer.* **Westland** : *S.51 helicopter.*



PEACEFUL PERFORMANCE : Quietly and smoothly the prototype Vickers-Armstrongs Viscount (4 Rolls-Royce Dart turbo-props) crosses the entrance to Pool Harbour. This efficient post-war civil transport, flown for its portrait by Mr. "Mutt" Summers, will be one of the major attractions at Farnborough next week.

DIO

Lympne 1948

A Day of Racing and High-Speed Events : Women's 100-kilometre Record Broken

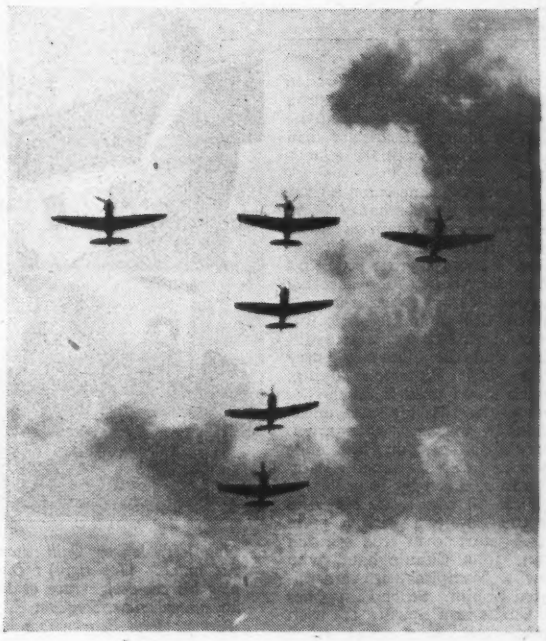
AGAIN the organizers of the Lympne Races were lucky with the weather and again they are to be congratulated on staging another highly successful meeting. Although the high-speed race is undoubtedly the main attraction, Lympne has become noted for excellent timing of events, and the introduction of some entirely new competition or demonstration.

On the stroke of 14.00 hrs the meeting was opened in true high-speed style by the arrival of four Vampires from Odiham. It was a well-timed and well-planned beginning which put everyone on their toes. Four Tiger Moths lined up for the first race to fly clockwise over 3 laps of the 5½-mile course which, this year, consisted of 5 legs. Pat Filingham in a London Aero Club machine won at 86 m.p.h. with C. F. Arthur of Fairoaks second and Tom Hackney of Cinque Ports third. The Attree-Miles team had obviously gone to a great deal of pains to map out a course for the one-type races which would give the spectators a constant view of progress. This would be difficult enough in flat country, but the situation of Lympne with surrounding valleys and woods accentuates the problem. This year's course—although perhaps better than the triangular one used in 1947—somehow contrived to ensure that the competitors were just out of sight most of the time. This was mainly because the competitors flew at or below tree-top height and only climbed to pass over the hedges and haystacks.

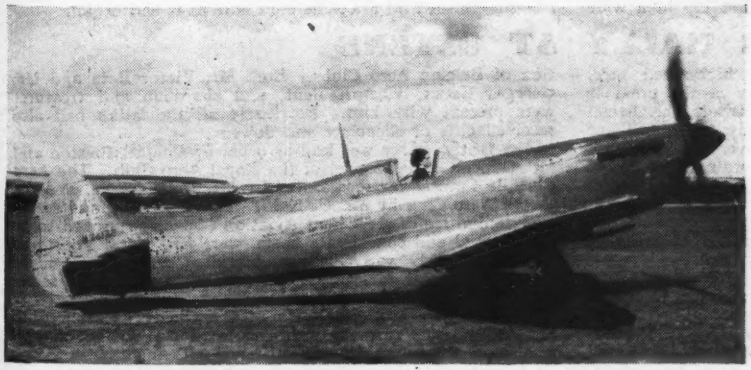
Spitfires of No. 615 R.Aux.A.F. Squadron demonstrating formation drill at Lympne.

By the time the Tiger race had ended S/L. Downey of No. 24 R.F.S., Cambridge, was already in the air in a Tiger to perform aerobatics. He finished a very polished display with a creditable attempt at a hesitation roll of which, in a Tiger Moth, he is said to have been the originator. The next event was the Magister race, which was won by D. J. Jemmett who held the lead throughout.

In the Auxiliary Squadron competition one representative was entered from each of the Reserve Groups, and a trophy was presented by the Air Council. All competing aircraft were Spitfires, Merlin or Griffon powered, and standard equipment in the Royal Auxiliary Air Force. They were handicapped in accordance with official speed figures for their respective marks. The course was approximately 100 miles, and the pilots were not notified of the turning points until 10 minutes before take-off. Three Spitfire 16s were first away with a 3 min 5-sec start, whilst the scratch man, from No. 603 Squadron, was in a Spitfire 22. During their take-off, Mr. Marmol had been towed to about 3,000ft in his Krajanek glider, and in silence we watched this Czech pilot's unique performance of loops, rolls, rolls off the top and inverted flying. A few minutes after he had landed, S/L. Dundas flashed over in his Spitfire 16 to win the Auxiliary competition for No. 65 Group. He was quickly followed by S/L. J. James of No. 501 Squadron, and then F/O. W. Benson of No. 1 Squadron.

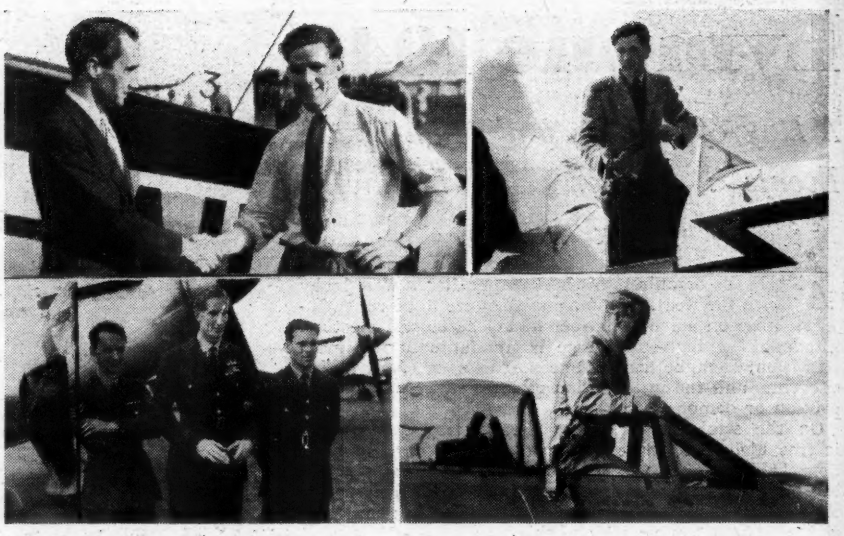


The Irvin-Bell helicopter rose into the air as the Vampires taxied in, and (below) Miss Lettice Curtis taxying to the line for the start of the high-speed handicap race.



Three competitors, all from Faireys, lined up for the Tipsy race; Peter Twiss took the lead during the first lap, but was overtaken by D. Masters, who held the lead for the rest of the race and won at 76 m.p.h. with Peter

Lympne 1948 . . . . .



(Top left) Jeffrey Quill shaking hands with F/L. Colquhoun, winner of the high-speed race at 324 m.p.h. (Top right) : D. J. Jemmett looks happy as he climbs from his Magister after winning his one-design race at 103.25 m.p.h. (Bottom left) : S/L. H. S. L. Dundas, D.S.O., D.F.C., with his ground crew, Sergeant E. Pettman and Corporal A. Hearn, standing beside the Squadron flag. (Right) : John Cunningham, second in the high-speed handicap race, won the Geoffrey de Havilland Trophy, by making fastest time of the day.

Twiss second and G/C. Gordon Slade third. No. 615 Squadron Spitfires then demonstrated the high standard of formation drill in the Royal Auxiliary squadrons.

At last the time came for the high-speed "merchants" to prepare for the main event in which there were two jet entries. It was a great pity that the long-hoped-for meeting between Vampire, Attacker and Meteor did not materialize this year. No Attackers were available, and the Meteor 7 entry with Bill Waterton flying, which stood until Thursday of last week, was, for some unexplained reason, withdrawn. Very sportingly, de Havillands at once entered a second Vampire to be flown by John Derry.

First off was J. O. Mathews in the Firefly 4 with a 5min 54sec start over the scratch man, John Cunningham, who flew a Vampire with an uprated Goblin. Second was Miss L. Curtis in a Spitfire 11, with 5min 29sec start, and third was a Spitfire Trainer flown by F/L. J. Colquhoun, with a start of 1min 59sec. Fifty-four seconds later W. J. G. Morgan followed the leaders in a Spitfire 24. "Wimpey" Wade was the last off of the piston-engined machines, with a start of 3min 40sec.

At the end of the first lap the order had not changed, and after the Firefly, Spitfire 11 and Spitfire Trainer had completed their first lap Derry took off 31 seconds ahead of Cunningham. Morgan then made his first turn as John Cunningham took off to chase the rest of the field and the Fury came over the airfield as the second Vampire raced down the first leg. On the second lap the Firefly was still in the lead, but the Spitfire Trainer actually passed Miss Curtis over the airfield at the very moment that Derry came in to his first lap in a wide turn, quickly followed by Wade in the Fury. One felt at this stage that it would be quite impossible for the jets to catch up. However, as they completed their second lap John Cunningham passed John Derry, and their individual turning techniques were unmistakable. Derry approached close to the turn and went into a sharp vertical bank, whereas Cunningham made a wide sweep around the last two bends of each lap and appeared to maintain his high speed throughout the turn. The handicappers excelled themselves, for the first four competitors could be seen approaching the finishing line apparently together and nobody could tell until the last moment who would be the winner. In fact, John Cunningham crossed the finishing line a few hundred yards behind the Spitfire Trainer after a truly brilliant race. Mathews in the Firefly was third, and Derry's Vampire fourth. Miss Curtis, finishing fifth, went on to beat the women's 100-kilometre closed-circuit International record at 313.2 m.p.h.

Tails well up at the start of the Tiger Moth race, which was won by Pat Fillingham.

As a finish of the excellent day, the Vampires from Odiham gave a brilliant demonstration of high-speed aerobatics, the most impressive trick being their change in formation, line astern to Vic at the top of a loop. Their individual slow rolls in line astern, and barrel rolls in Vic formation were a joy to watch, and the fourth machine, which filled in the gaps, made some impressive low-level runs and inverted climbs. And so the meeting finished on the same high note as it had begun.

AIR RALLY AT OSTEND

WITH the excitement of the Lympne high-speed race, Vampire aerobatics and evening party of the previous day still buoying the spirits of many of the visitors, the Ostend Rally got off to a flying start in every way. The brilliant sunshine which favoured most of Europe over the week-end, encouraged an early take-off on Sunday morning, and before noon a large number of aircraft from England, France, Holland, Denmark and Belgium had arrived bringing the week-end guests of the Ghent Aero Club.

At a dinner-dance in the evening speeches of welcome and replies were made in several languages, and the winners of the arrival competition were announced. Both first and second prizes went to Holland; Mr. R. Uges won a large cup and Mr. E. J. W. Schuller an attractive ornamental bell. After the presentation of these prizes every guest received a handsome plaque as a souvenir of the international rally, presented by Count Arnold de Looz-Corswarem, president of the Federation of Belgian Aero Clubs. Both Mr. Victor Boin and Mr. Georges Hanet, vice-president, and chairman and treasurer were present with him. Previously all the ladies had also received gifts of chocolate and flowers.

The British party was lead as usual by Colonel Preston and Mr. Duncan de la Hoyde, of the Royal Aero Club. The Aero Club de France was represented by Mr. Delandsorne, and the Dutch Aero Club by Mr. C. Kolff. The organizing and reception committee of the Ghent Aviation Club, who proved to be most genial and considerate hosts, were Mr. Pierre Voortman and Mr. Freddy van Gheluwe, president and vice-president respectively, and Mr. Guy Fecheyr, the hard-working secretary.

The kindness and generosity of the Ghent Aviation Club who, because no currency whatever is allowed to British visitors, were obliged to provide entirely for their guests, will not be forgotten by those who spent such an enjoyable week-end.

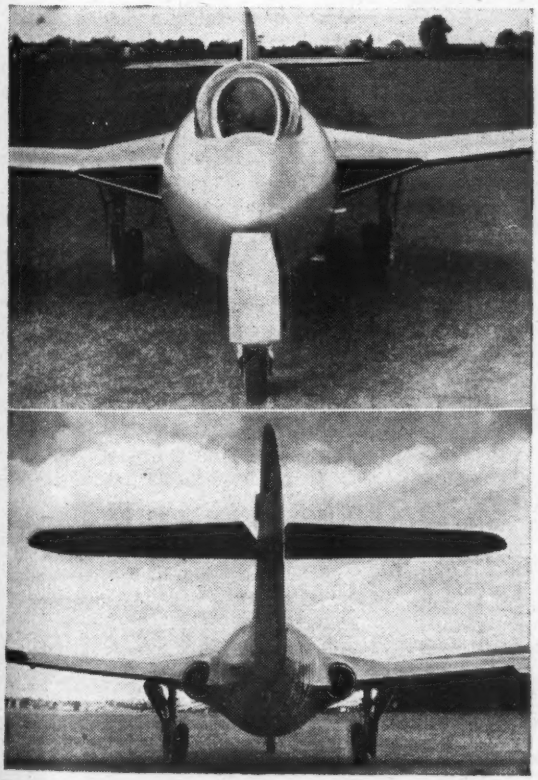
D12

A HAWKER OCCASION

First Public Demonstration of the N.7/46 Jet Fighter

(Illustrated by "Flight" photographs)

LITTLE technical information concerning the Hawker N.7/46 Naval jet fighter (R.-R. Nene) can be added to that given in *Flight* of July 29th, but after witnessing Mr. T. S. ("Wimpey") Wade's demonstration at Langley last Tuesday week it is possible to remark in general terms on certain characteristics of the aircraft. In the first place it may be reported with the utmost confidence that in the "N.7," and its land-based version, the P.1040, Hawkers have a design of exceptional promise. Especially impressive was the standard of manoeuvrability at very high speeds (on one or two occasions 600 m.p.h. was touched and exceeded); the rapidity of take-off from grass; and the remarkable field of view from the beautifully enclosed cockpit.



A view of the new Hawker jet fighter which illustrates not only its fine lines but the skill with which Mr. Wade "placed" it for the photographers. Showing (left) the entries to, and exits from, the Rolls-Royce Nene, of 5,000 lb static thrust.

Onlookers who are now *blasé* where ultra-fast aircraft are concerned, remarked on the lack of noise—possibly a further result of the bifurcated jet trunk, the main advantage of which appears to be the allowance of an unusually large internal tankage. These hardened observers, in unison with Hawker's Langley staff, justly applauded Mr. Wade after his memorable demonstration of a very beautiful and obviously "right" aircraft.

Excellence Explained

Asked just why the "N.7" was so good, Wade spontaneously replied "Because it is a Hawker product"—a pronouncement with which few would seek to argue. As an ex-journalist he was reticent in quoting quantitative data; he did, however, confirm that his tight turns inside the airfield perimeter were registering accelerations of 5-6g.

Equally impressive were the inverted climbs (during which a white plume of fuel trailed from the vent) and the series of four fast, smooth rolls at low level. Wade's judgment was perfect throughout, and fully worthy of that displayed by Mr. Sydney Camm and his design staff who have so brilliantly balanced speed and rate of climb against range and other qualities demanded of a modern Naval fighter.

HERE AND THERE

A Sea Hornet for Australia

THE Ministry of Supply has sent a de Havilland Sea Hornet to Australia for testing under tropical conditions. It is being assembled at the R.A.F. Station Naverton, Victoria, and when flight tested will be handed over to the Service Aircraft Research and Development Unit to be subjected to other tests.

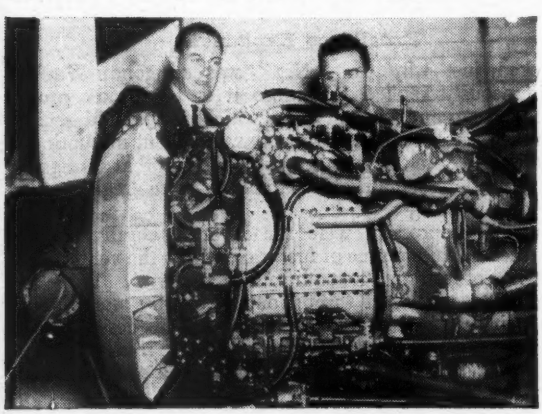
Vampires Return

ON the return, last Thursday, of the transatlantic Vampires of No. 54 Squadron, Marshal of the R.A.F. Lord Tedder sent the following message to S/L. R. W. Oxspring, Commanding Officer of the squadron: "Good show. Congratulations. A good notch to add to 54's record."

Lord Tedder also sent the following personal message to Air Marshal Sir William Elliot, A.O.C.-in-C., R.A.F. Fighter Command. "Please convey my hearty congratulations to W/C. Wilson-Macdonald and all the crews, air and ground, whose high standard of efficiency, keenness and discipline have carried through this historic flight with such outstanding success. Not least is credit due to S/L. Oxspring and his pilots of 54 Squadron for their faultless display of flying skill—varying as it has done from high-speed acrobatics to transatlantic flights. Altogether a fine job well done, which has shown the world that despite all the post-war difficulties, the Royal Air Force standards remain as high as they have ever been." W/C. Wilson-Macdonald was the force commander.

M.o.S. Congratulations

ON completion of the successful sealed endurance test of the Armstrong Siddeley Mamba propeller turbine, reported on page 281 of this issue, the Minister of Supply, Mr. G. R. Strauss, sent a telegram of congratulation to Armstrong Siddeleys: "I have just heard of the fine performance of the Mamba in completing to-day the 500 hours endurance test. It is a great tribute to your designers and workpeople that the Mamba has emerged with flying colours from this severe test. This is further evidence of the advanced design and sterling quality of British gas turbine aero engines. Congratulations to you all."



EXAMINATION: The 500-hour-test Mamba, to which reference is made on page 281, is here seen on completion of its run. Armstrong Siddeleys superintended the test and A.R.B. official observers are examining the engine.

SWITCH OFF: A.V-M. E. J. Cuckney, C.B., C.B.E., D.S.O., of the Ministry of Supply, switching off the D.H. Goblin on completion of its proving trials, reported elsewhere in this issue. Next to A.V-M. Cuckney are (left to right) Mr. A. F. Burke, Maj. F. B. Halford, Mr. E. S. Moult, Mr. J. L. P. Brodie, Mr. H. Buckingham, Mr. F. Bench and Mr. J. Morton, all of the D.H. Engine Co. Ltd.

The Geoffrey de Havilland Trophy.

Bristol Display Postponed

AS we go to press we learn that the air display arranged for September 4th by the Bristol and Wessex Aeroplane Club has been postponed until September 25th.

Attackers for the Navy

VICKERS-ARMSTRONGS have been authorized to proceed with the purchase of material and manufacture of jigs and tools for production of Attacker jet fighters for the Naval Air Arm. This good news is not altogether unexpected, Naval interest in the Attacker having been stimulated by the highly successful deck-landing trials.

Geoffrey de Havilland Trophy

IN the High-speed Handicap at Lympne on August 28th, a report of which appears elsewhere in this issue, the first award of the new Geoffrey de Havilland Memorial Trophy, this year for the fastest speed of the race, was won by John Cunningham in a Vampire. Presented by colleagues of the late Geoffrey de Havilland in the experimental department of D.H.'s, this trophy bears a medallion with his head in bas-relief, and each winner will be given a replica of this in the form of a silver medal. Each year the Racing Committee of the Royal Aero Club will decide for which race the trophy shall be awarded, the intention being that it should be for the principal British high-speed race of the year.

Electioneering from the Air

IN the campaign of the Swedish Conservative Party in the forthcoming general election in September, it is planned to employ an aircraft for broadcasting over loudspeakers, messages to the public. Equipped with public-address apparatus the machine is expected to fly at about 1,500 feet and throttle back when the speaker starts his propaganda talks. Tests have been carried out and the sound is reported to be audible over an area of several square miles; this method of broadcasting though, is said to be suitable only for

HERE AND THERE

rural areas, since the noise of traffic in densely populated cities drowns the loudspeaker.

A Regrettable Absence

SINCE the survey of British aircraft, one of the major features of this issue of *Flight*, was compiled, it has been made known by the de Havilland Aircraft Company, Limited, that the D.H. 108 high-speed research machine will not appear in the S.B.A.C. Display. The company regretfully decided to withdraw the 108 to avoid what would amount to a fortnight's delay in some urgent experimental work.

U.S.A.F. Maintenance Base

THE greatly increased activities of the U.S.A.F. in Europe recently have made it necessary to set up a maintenance and repair base in England. The American Air Force have established this depot at Burtonwood where aircraft engaged on the supplying of Berlin and on training flights in Europe will be serviced. It will be remembered that the Americans used Burtonwood during the recent war.

Rocket Range Visit

A CONFERENCE of Australian building trade unions recently asked the Commonwealth Department of Supply and Development for permits for trade union leaders to visit the Woomera Rocket Range. The list of names submitted for whom permits were requested contained a number of Communists and only six permits were issued; the proposed visit, the purpose of which was to examine wages and conditions, has been abandoned.

BLOCKADE BUSTER: An American Army XC-74, better known as a Globemaster or Douglas DC-7, unloading 20 tons of flour at Gatow airport, Berlin. The type had not been seen in Europe before.

News in Brief

After a three weeks' air tour of Canada, 25 A.T.C. cadets returned to London recently. Everywhere they went in Canada they were given an excellent reception.

* * *

As part of the civic celebrations of the Dutch town of Alkmaar passengers travelling on K.L.M. aircraft on Saturday, August 21st, were presented with Dutch cheeses. Alkmaar is the centre of this industry in Northern Holland.

* * *

On Sunday, September 5th, a rally of West London model aircraft clubs, in co-operation with the R.A.F.A., will be held at Langley airfield, by permission of Hawker Aircraft, Ltd. Profits will be given to the R.A.F. Benevolent Fund.

* * *

United Air Lines are flying over 250 pounds of live lobsters daily from Toledo to Los Angeles; these crustaceans can survive at high altitude and are packed in cardboard containers with seaweed and frozen sea-water.

* * *

During a recent flight over the Atlantic the cabin-heating system of an S.A.S. DC-6 temporarily went out of action. When warmth was restored an interested lady was heard to remark: "You can tell we are crossing the Gulf Stream—it's suddenly got much warmer."

* * *

After their wedding at St. Margaret's, Westminster, Lord and Lady Tweedsmuir took off from Hendon in a Consul specially chartered for the occasion from Airwork, Ltd. Before starting for Dyce the Consul's captain presented Lady Tweedsmuir with a bouquet on behalf of Airwork, Ltd.

* * *

Maj. Gen. H. Riiser-Larson has been appointed President of Norwegian Air Lines—D.N.L.—one of the partners of the Scandinavian Airlines System. Col. B. Balchen, who was responsible for the technical and operational sections of D.N.L., has returned to the U.S.A. to take up an appointment with the Air Force there.

* * *

At the international air display at Long Island, New York, a new fuelling system was used for refuelling jet aircraft. Claimed to be three times as rapid as the conventional method this new system utilizes four 25,000-gallon tanks, and though details are not available, presumably a high-pressure head is employed.

* * *

To convey school children and students from England to their homes in Africa during the holidays Airwork, Ltd., have been using a Viking carrying 27 children per trip. Three trips are to be made to convey 81 young people on this holidays-at-home scheme. It is hoped to operate a similar air express service for the Christmas holidays. Special reduced fares are being charged for these flights.

HIGH POWER/WEIGHT: The jet-propelled model of Mr. E. Jaggers made a flight at the recent rally at Radlett at 150 m.p.h. (unofficial). The propulsion unit works on the same principle as those of the German VI flying bombs and runs on lighter fuel. The weight of the power unit is 16 ozs.

CIVIL AVIATION NEWS

Mercury Airways' Dispute with M.C.A. : Expansion at Cyprus

CIVIL EXPERIMENTS: Considerable research in the civil field is under way at Weybridge and Wisley. Vickers-Armstrongs are gaining experience with the Nene Viking, which in this photograph is framed by the tail of the Viscount. Development of the first prototype Viscount is progressing and experience with that aircraft will be put into the second which is on order for the Ministry of Supply.

TRAVEL CREDIT

BY arrangement between international and domestic airlines in North America a credit system for air travellers will come into operation on October 1st. By making a deposit with one airline to secure a credit card, travellers will be able to fly on any airline subscribing to the system. In order to conform to national exchange controls, cards will be issued in three categories; territorial cards, which will be available in North America, the West Indies, the Bahamas, Bermuda, Newfoundland and Hawaii; international cards available for unrestricted universal travel; and controlled cards which can be used only within the limitations prescribed by certain countries on the amount of money that can be spent abroad. Air travel credits, which are similar to letters of credit, will be issued in conjunction with controlled cards. Settlement of credit accounts between the airlines will be made through the clearing house at London and Chicago. Temporary headquarters will be at Washington of the 12-member committee which has been nominated to administer the plan and on which I.A.T.A. and the Air Traffic Conference of America are represented.

RISES IN I.N.A. TRAFFIC

AIR travel in India is growing in popularity, during the year ended June, 1948, Indian National Airways carried 66,688 passengers—nearly twice the total number transported during the first thirteen years of the company's existence—and freight, excluding mails, totalled 3,060,772 lb, representing an increase of 300 per cent over the previous year's figures. As a result of the partition, route network was cut by 48 per cent, but total traffic ton-miles showed an increase of 24 per cent, and altogether 2,151,169 miles were flown on scheduled and non-scheduled flights in 13,094 hours during the period under review. Indian National Airways has now completed fifteen years of operations

S. AFRICAN CHARTER FLIGHTS

MR. GORDON T FILLERY, chairman of Mercury Airways, came to England last week to clarify with the M.C.A. the present situation with regard to Mercury Airways' flights into the U.K., and to examine the possibility of purchasing aircraft. Mercury Airways have been operating regularly between S. Africa and England during the last two years, but restrictions have recently been placed upon the company by the M.C.A. Mr. Fillery considers the validity of Section 23 of the Civil Aviation Act to be doubtful when applied to a South African airline since it would appear contrary to the Chicago Convention. He has also observed that at the I.C.A.O. meeting at Geneva the British interpretation of scheduled and non-scheduled airlines was not accepted by the Assembly.

The object of Mercury Airways is to introduce three classes of travel—luxury, normal and cruiser, with varying prices, in order to provide air travel between the U.K. and S. Africa at low cost. Already they have introduced reduced excursion fares, a P.A.Y.E. system of payment, and conducted air tours. It is intended to reduce fares in the near future to make it possible for emigrants to fly from Europe to S. Africa for £90 or less. Whilst over here Mr. Fillery had intended to examine the possibility of purchasing British aircraft. The un-co-operative attitude of the government, however, has caused him to reconsider the idea. The airline is now being refused facilities at Rhodesian airports, and although officially entitled to carry mail from Greece to Africa, the post office in Rhodesia is refusing co-operation. It is possible that in future the airline may be forced to use the West Coast route instead of passing through British territory.

BRITISH AIRWAYS STATISTICS

STATISTICS for scheduled services by the three British corporations showed increases in May, 1948, over the same month last year. Aircraft miles increased by 14.1 per cent, passenger miles flown by 26.6 per cent, mail ton-miles by 23.6 per cent, and freight ton-miles 53.1 per cent.

In B.E.A. there was a decrease in the number of charter and special flights from 6,520 to 5,445. The equivalent annual utilization per aircraft was 1,263 against 1,160 the previous year, and in the period April-May, 1948, utilization was 1,194 hours. B.O.A.C. utilization per aircraft in May this year was 1,155 against 1,237 last year, and for the period April-May 1,206 hours. In the Atlantic Division of B.O.A.C. the passenger load factor was 48.4 per cent in May, compared with 71.3 per cent last year. In April-May this year the figure was 50.5 per cent, compared with 66.1 per cent last year. For some reason the equivalent annual utilization for each aircraft is not recorded for individual Divisions. B.S.A.A. revenue passenger load factor was 48.3 per cent this year against 67.8 per cent last year, and the equivalent annual utilization for May, 1948, was 1,425 hours against 1,095 hours last year. The number of revenue passengers carried by B.E.A. for May, 1948, was 90,259, an increase of 27.6 per cent which compares with B.O.A.C.'s revenue passenger figurer for 1948 of 19,952, an increase of 28.3 per cent.

CYPRUS AIRPORT

TO cope with the increasing air traffic passing through Nicosia, Cyprus, extensive development has been planned for the airport and airport buildings. Patterned on modern lines the buildings are already in course of construction. To allow for possible further expansion, the layout is designed around a central car park, to the left of which is located the office block for the airport manager, station superintendent and operating airlines' representatives; whilst at the end of a central approach is a restaurant, overlooking the main runways, and air crews' rest rooms. The terminal station, designed by Mr. Mackay, A.R.I.B.A., of the Colony's Public Works Department, is located near the apron, and will consist of yellow stone buildings of bungalow type with wide verandahs, which will house Customs, Immigration and Health

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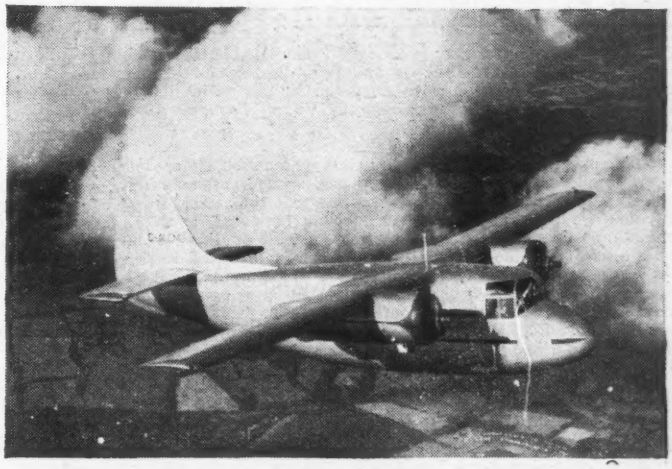
Officers. These buildings are to be provided with baggage and document examination counters running on both sides fitted with self-balanced, sliding sash windows, which afford an unbroken counter space when open, and which close easily in bad weather. At the end of the terminal building are the waiting room and cloak rooms. A small buffet is to be included for the convenience of passengers in transit, and there will also be accommodation for ground staff, freight police and night staff.

B.O.A.C. CONSTELLATION MAINTENANCE

DURING the move of the B.O.A.C. North Atlantic Division from Dorval, Montreal, to Filton, Bristol, the maintenance of the corporation's Constellation fleet has presented somewhat of a problem, since special equipment and, of course, spares will be required. No such special equipment or quantity of spare parts are held in the United Kingdom, and the B.O.A.C. depot at Croydon is primarily established for equipment repair and not as an aircraft maintenance base. Moreover, Croydon is not suitable for taking Constellations. K.L.M., the Dutch airline, however, carry out maintenance of their own Constellation fleet at Schiphol, and that company has offered to do the necessary work for B.O.A.C. during the move, which would be over a period of weeks only. The expenses involved would be paid in guilders, which are not at the moment hard currency. It is understood that B.O.A.C. are considering the offer, but no contract has yet been signed. It will be remembered that when the move was originally announced B.O.A.C. stated that the regular services across the Atlantic would continue without hindrance.



FINAL TOUCH: With internal furnishings completed, the Percival Prince has now been decorated externally. The photograph shows it undergoing further tests but appearing more as an airline aircraft than as a prototype.

BREVITIES

A REPORT from Australia states than Trans Australia Airlines, the Federal Government-owned internal airline, lost nearly £A270,000 (£216,000) during 1947-48. Losses for the previous financial year were £505,000 (£404,000).

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On October 15th Pan American Airways will start services to Barcelona, Spain. The route from New York will pass through the Azores and Lisbon.

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S.A.S. Vikings are making special flights during August, September and October from Copenhagen through Zurich, Rome, Athens, Cairo, Wadi Halfa, Khartoum, and Juba to Nairobi.

* * *

July tourist figures into the United Kingdom were the highest ever recorded, and of the total number of visitors, exceeding 90,000, about one-third travelled by air. More than 15,500 were American visitors, and the total from the United States this year already amounts to 46,000.

* * *

British South American Airways' aircraft *Star Leopard* arrived back at London Airport on August 23rd, completing the first Tudor IV round trip to the Bahamas since the type was withdrawn from service subsequent to the loss of the *Star Tiger* in February. The 11,000-mile flight was completed 40 minutes ahead of schedule.

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In a description of the Percival Prince in *Flight*, August 19th, reference was made to Janitrol cabin heaters. The equipment is in fact designed, manufactured and supplied by Messrs. D. A. Daniel and Company, Limited, of North Wales, who have no connection with the manufacturers of Janitrol heaters. The British firm undertook modification work on Janitrol heaters on behalf of the Ministry some three or four years ago.

* * *

To augment the normal daily service between London and Copenhagen during the period of the forthcoming Danish exhibition from September 18th to October 3rd, the B.E.A. service to Stockholm will also call at Copenhagen. With the introduction of winter schedules on October 3rd, however, the London-Copenhagen service will be suspended while the London-Copenhagen-Stockholm service will continue to operate throughout the winter.

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Philippine Airlines have been negotiating for some time with the Australian authorities for a Manila-Sydney air service, which they will be ready to start in October if permission is forthcoming from the Australian Minister for Air.

Consolidated Vultee Convair 240, registration VH-TAQ, christened *John Forrest* by T.A.A., was expected in London last week-end. This aircraft, which is the first of five to be delivered to the Australian company, is carrying spares; the others are due to follow at fortnightly intervals.

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B.S.A.A. have converted one York, *Star Quest*, for tourist traffic on the Miami-Nassau route. Accommodation is provided for 19 passengers in the aft cabin, and the forward compartment has been converted into a fully equipped galley and baggage compartment. It is understood that the corporation has introduced a new type of seat and fluorescent lighting.

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American Airlines have now introduced a sleeper service between New York and Los Angeles. Berths will be provided for 12 passengers and the remaining 36 in the Douglas DC-6 will be provided with the normal reclining chairs. The extra cost for the trans-continental flight will be £22.

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Norway's flying-boat base at Bergen was transferred on August 21st and 22nd from Sandviken to Hjellestad, about 13 miles south of Bergen. The change-over was necessary owing to heavy traffic in Bergen harbour which made it difficult to use Sandviken as a seaplane base. Provisional buildings have already been erected at Hjellestad, and radio aids have also been transferred to the new base.

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K.L.M. are again seeking experienced pilots of British nationality. Pilots will be enlisted in two categories—one specifying a minimum of 2,000 flying hours, a "B" licence endorsed for DC-3 aircraft, a second N, and an upper age limit of 32. The other category has an upper age limit of 26 and a minimum of 1,000 flying hours, a "B" licence, and preferably a second N. K.L.M. already employs a considerable number of British and Dominion pilots. Earlier this year the company introduced a scheme to assist 16-year-old Dutch boys to make a career in civil aviation by giving *ab initio* training before entry into the Netherlands Air Force. Their final training as commercial pilots will be completed at the end of their official government training period.

* * *

First of the five Vickers Viking aircraft to be operated by British West Indian Airways in place of their present fleet of Lockheed Lodestars, was christened *Trinidad* at a recent ceremony at Piarco airport. Speaking before the ceremony, Commander A. D. S. Murray, general manager of B.W.I.A., said that when the full Viking fleet was in operation twice as many passengers would be carried; three amphibians would also come

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into use shortly, and the company would then be able to extend services to most of the Leeward and Windward Islands. The ceremony was concluded with a speech by Sir John Shaw, Governor of Trinidad, after which the Viking *Trinidad* gave a demonstration flight.

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Malayan and Australian civil aviation representatives recently made a two-day inspection of the airfield, used during the war, on Cocos Island. It is possible that the airfield may become a staging post on a new air link between Australia, the Middle East and the United Kingdom, and would serve as an alternative to the present route through Malaya and India. As reported in *Flight*, August 12th, Qantas Empire Airways are planning an air service between Western Australia and South Africa, which may be routed via the Cocos Islands. It is understood that the 2,500-yard runway was found to be in fair condition, and it was considered could be used after reconditioning for aircraft up to the weight of Lancastrians.

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Fire which broke out at about 2200 hrs on August 23rd severely damaged the aircraft maintenance and servicing section of Trans-World Airlines at Shannon airport. The airport brigade prevented the flames from spreading to the rest of the buildings and to the fuel depot, which contained more than 500,000 gallons of aviation spirit, and two jeeps and an Irish Army Anson were also saved from the fire. A Skymaster engine and the company's radio equipment were damaged, and the airport lighting system failed, but it is not yet possible to estimate the damage. This is the second fire at the airport, the first being in March this year, when the control tower was burnt out and surrounding buildings were badly damaged.

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Frequencies of the S.A.S. Arctic service are to be altered owing to the shortening hours of daylight in the areas north of the polar circle. Flights between Stavanger and Tromso are to cease, and the service between Tromso and Kirkenes will also be discontinued from September 11th. A service between Tromso and Oslo, operating three times a week in each direction and using 37-seater Sandringham flying boats, will begin on September 13th and continue until October 2nd, after which it will be too dark to maintain regular schedules; and also from September 13th Sandringhams will operate daily (Sundays excluded) between Bergen and Oslo. This latter route will continue until winter conditions make further operations impossible, and will start again at the earliest opportunity next spring.

FROM THE CLUBS

OWING to difficulties in organization the Northamptonshire Aero Club will not be holding the proposed air display at Sywell next Saturday, September 4th.

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MR. W. C. E. BACON has presented the Lancashire Aero Club with Tiger Moth G-AKXA, which has been recently overhauled and re-sprayed in the club colours. The club's first post-war ball will be held in the Grand Hotel, Manchester, on October 8th, and tickets at £2 2s each can be obtained from the Secretary, Lancashire Aero Club, Barton Aerodrome, Eccles, Lancashire.

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THE United Services Flying Club Display has been arranged this year for September 5th. The day starts with a breakfast patrol, and during the morning there will be a pin-pointing and bombing competition for club members and visiting aircraft. Luncheon will be served in the new restaurant adjoining the bar and refreshments will later be available during the main display, which starts at 1415 hours. The club is looking forward to entertaining many visitors on that day.

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FROM August 1st, 1947, to July 31st, 1948, London Aeroplane Club flew over 1,900 hours, passed out 54 pupils for solo flying and 35 for "A" licences. In addition 20 "A" licences were renewed. This was the end of the club's first year under the control and management of the de Havilland Aeronautical and Technical School. Membership of the club now numbers 212, and the fleet of aircraft consists of four Tiger Moths and three Hornet Moths. The London Aeroplane Club was formed in 1925 at Stag Lane, moved to Hatfield in 1933 and was re-formed after the war at Panshanger. The club now has a lounge, restaurant and bar, but the facilities do not compare with those it enjoyed at Hatfield. The move was necessary owing to the amount of high-speed flying at the de Havilland company's airfield.

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WEATHER in July was more favourable than in the previous month and resulted in a total of 250 hours flying being completed by the Luton Flying Club. The club's Magister has been undergoing C. of A., and with its inclusion there will be Tigers, Austers, a Magister and Proctor aircraft available for instruction. Mr. Vinten, who took his "A" licence at the club last year, is now flying his own Proctor.

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NEW ZEALAND'S Minister of Finance stated recently in the House of Representatives that he was opposed to granting air taxi licences to flying clubs, on the ground that such operations would be uneconomic. The granting of such licences to supplement their revenue has been strongly urged by clubs, the majority of which, unaided by an effective government subsidy, show a loss of £1,000 to £1,500 a year.

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AN international air rally is to be held at Sion, Switzerland, on September 25th and 26th. Competitors should arrive between 1500 and 1730 hours on September 25th. A grand ball will be held at the Hotel de la Paix, Sion, beginning at 2100 hours on that date. The following day's programme, September 26th, includes motor-bus tours of local beauty-spots, and a flying display will be put on by G. Burlet flying a Bücker and by Rolf Isler, in a special WLM glider. Aerial tours and joy-rides will be given in aircraft belonging to Swissair.

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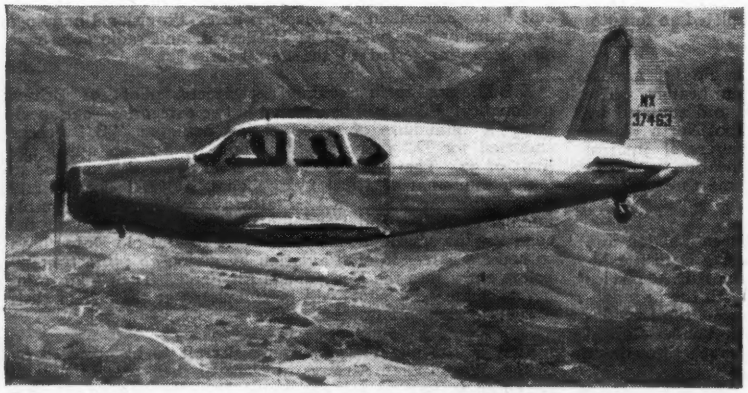
CONDITIONS were ideal at Cowes on Sunday, August 22nd, for Cowes Aero Club's display, which drew 4,000 spectators. A surprise item was a demonstration of the Saunders-Roe jet flying boat by Geoffrey Tyson. He gave the spectators a superb display of slow rolls, some of which were very slow indeed, and inverted flying near the ground. There were 54 visiting aircraft, of which quite a number stayed overnight, and visitors were able to join in the club's usual Sunday night dance. The opening ceremony was performed by A. Cdre. A. V. Harvey, C.B.E., M.P. During the afternoon there were demonstrations of an Olympia Sailplane by F/L. Jennings, a Miles Messenger by Bill Shipside, of Nottingham, a Newbury Eon by Jimmy Antill, and an Auster Autocrat by Peter Gooch. Other items included aerobatics by a Moth Minor, a novelty flying item by S/L.s Hellyer and Tribe of No. 14 R.F.S., and bombing and height judging competitions.

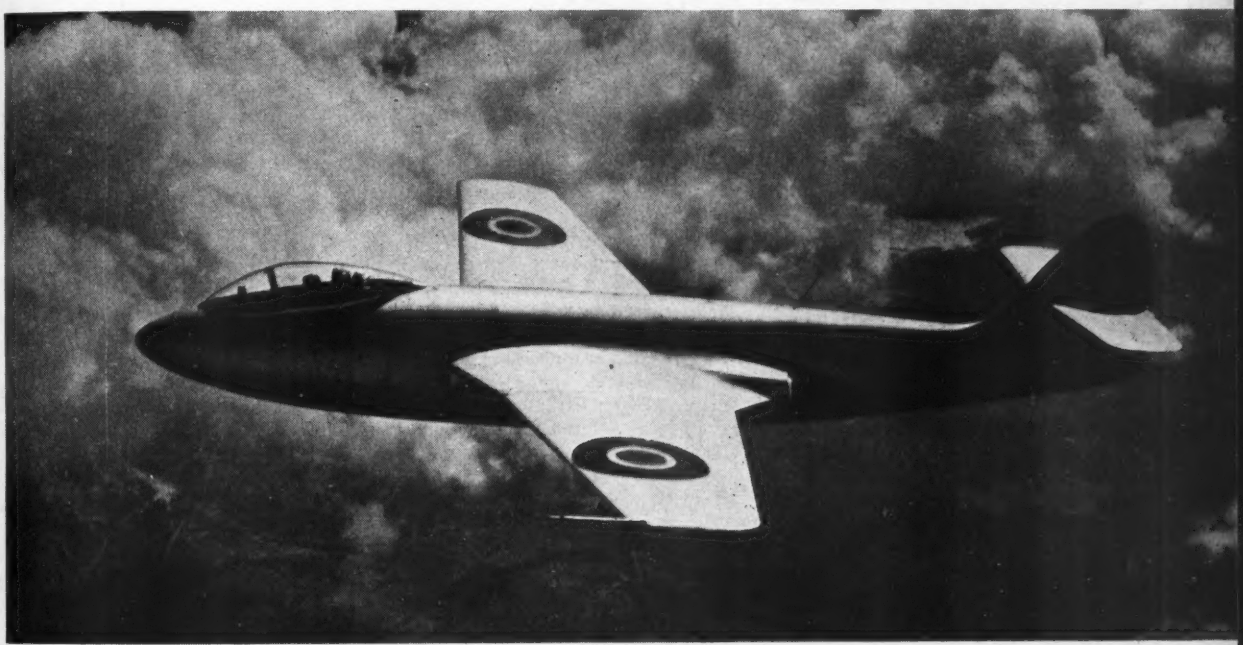


FOR PRIVATE OWNERS: A new 4-seater aircraft has been produced by the Atlas Aircraft Company to sell at approximately $3,000. Known as the H-10, it is powered with a 250 h.p. engine and is said to have a speed of 170 m.p.h. at sea-level with a range of 800 miles.

TEN WITH TURBINES

FOR a year or more hardly a month has passed without some new type of British turbine-powered aircraft making its maiden flight, or some turbojet or turboprop unit being first announced or air-tested. This is a very healthy state of affairs, and those who have brought it about may with satisfaction and confidence watch their charges perform at Farnborough. To their vision and skill these pages are a tribute.

Impressive as are the new turbojet fighters (Hawker N.7/46 and P.1040, and Gloster E.1/44), these machines have counterparts in America and other countries, whereas the Vickers-Armstrongs Viscount and Nene-Viking—respectively the world's first turboprop and turbojet transports—are unique, as are the Boulton Paul Balliol and Avro Athena three-seater turboprop trainers. That the first Armstrong Whitworth Apollo could not be completed in time for exhibition is a matter for keen regret, for this most promising 24/31-passenger machine would have afforded instructive comparison with the Viscount. Unlike the Viscount, which in the

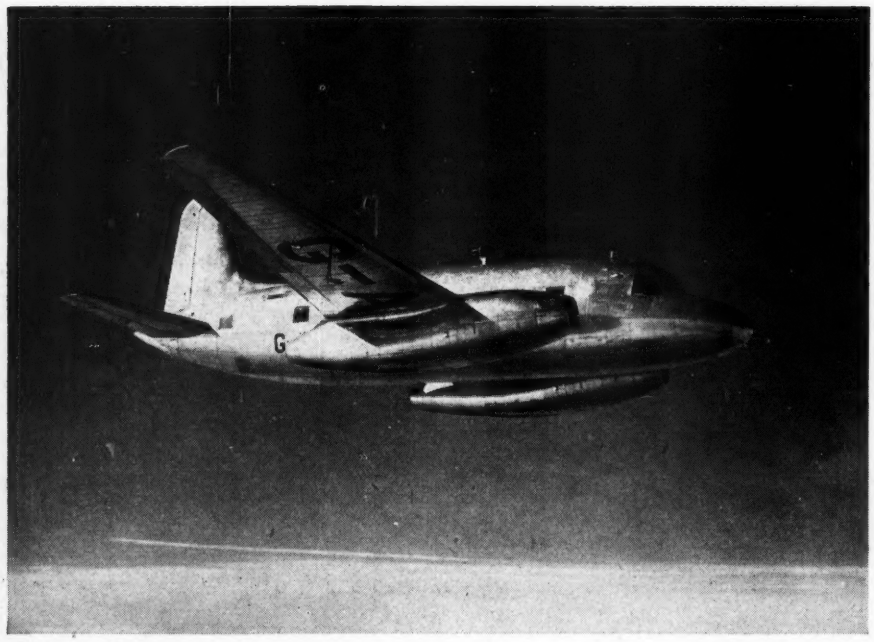


Hawker N.7/46

first instance, at least, has Rolls-Royce Darts, it is fitted with four Armstrong Siddeley Mambas, though versions with Rolls-Royce Merlin 35 or Pratt & Whitney Twin Wasp reciprocating engines have been the subjects of design studies.

Except for the Dart-Lancaster flying test bed, the Viscount is the first machine to fly with the compact little Rolls-Royce turboprop, which delivers 325lb static thrust in addition to its 1,000 shaft horsepower. Decisions arising from production policy rather than from technical considerations render the commercial future of the Dart uncertain, but the alternative installation in the Viscount of Napier Naiads has been foreseen. The increased power of these units (1,500 s.h.p. plus 240lb static thrust) will greatly improve performance, the maximum speed of 370 m.p.h. being nearly 40 m.p.h. higher than that of the Dart version. Even the relatively low-powered Dart-Viscount has an unusually high rate of climb (1,675ft/min at sea level), a characteristic which can be attributed in part to the high percentage of maximum power available for climb, but also to the low specific weight and amazingly small frontal area of the Darts. With its super-abundance of thrust (10,000lb static at sea level), the Nene-Viking research airliner makes even the nimble Viscount appear sluggish, having a rate of climb approaching that of a Spitfire (10,000ft in three minutes).

Whereas the Boulton Paul Balliol and Avro Athena 3-seater advanced Service trainers, each with a single Mamba, were designed to meet the same specification, and are to be matched against each other before one type is selected for quantity production, the Gloster Meteor T.7 Trainer is intended for a totally different purpose. Possessing a performance superior even to



Vickers Nene-Viking

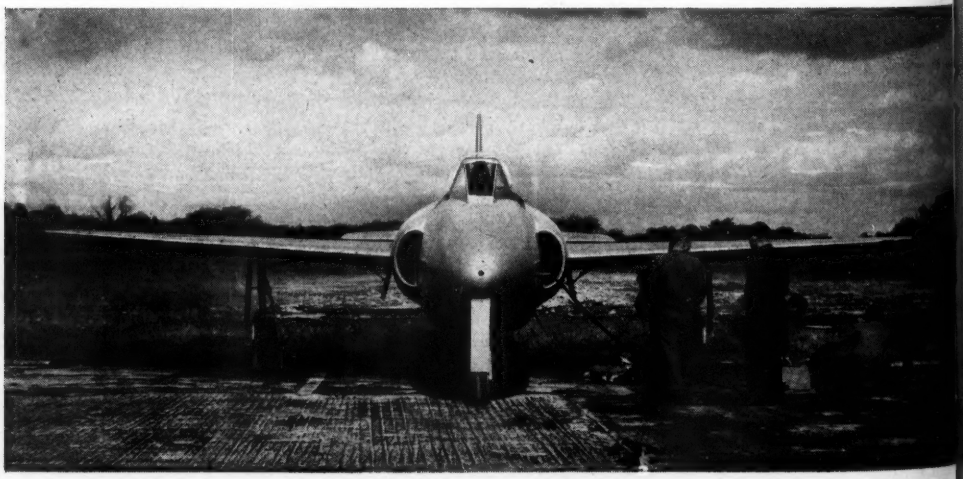
TEN WITH TURBINES . . .

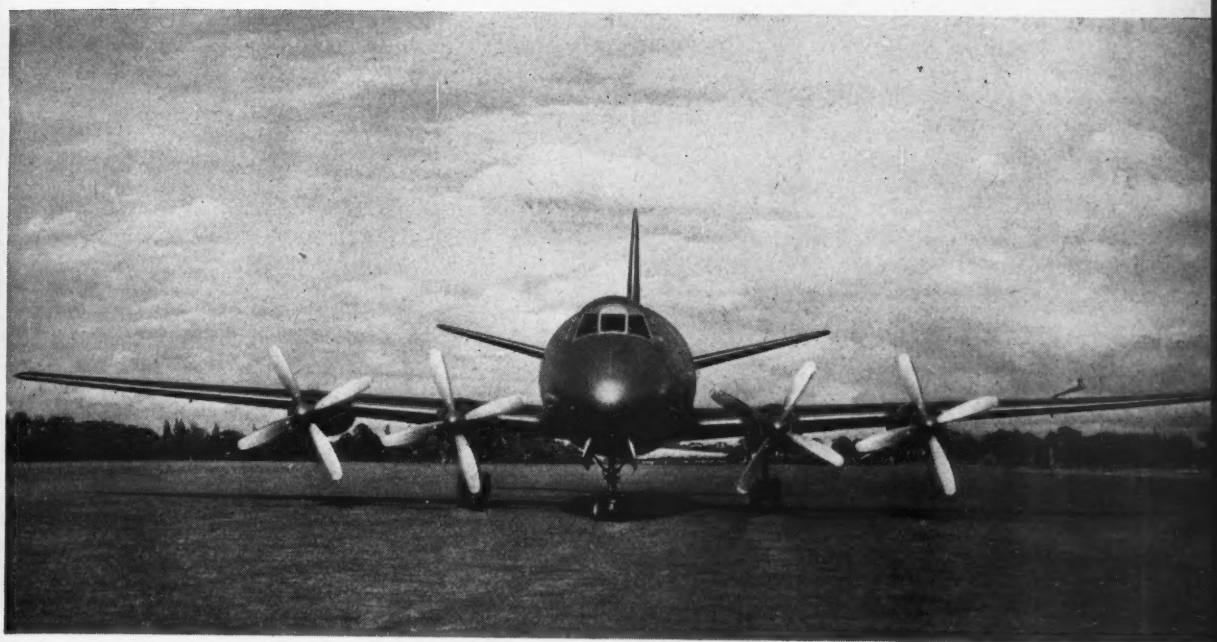
that of the Meteor 4 single-seater fighter, it will be employed, in this country and abroad, to train pilots in handling and navigating future jet aircraft which, irrespective of duty, will attain speeds in excess of 550 m.p.h. and, in most instances, are likely to exceed that figure by a very wide margin.

Two fighters and three research aircraft complete the gallery of ten selected types. The fighters (Hawker N.7/46 and Gloster E.1/44) are comparable in that each is powered with a single Rolls-Royce Nene, but differ in that the Hawker alone has a bifurcated jet outlet. Though the E.1 was designed strictly for land operation, the N.7/46, as its designation denotes, has been built to the requirements of the Royal Navy; in the P.1040, however, it has a land-based counterpart, and in the still more recent E.38/46, details of which are withheld, a " swept-back " derivative of exceptionally high performance.

The Hawker N.7/46 and P.1040, which, for the purposes of discussion, are similar, stand out from the general run of jet fighters in their powers of manœuvre at very high speeds and in having built-in tankage sufficient to ensure a long range without recourse to ex-

Gloster E. 1/44

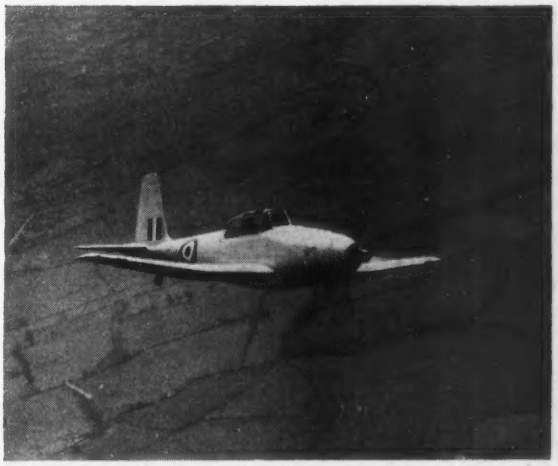




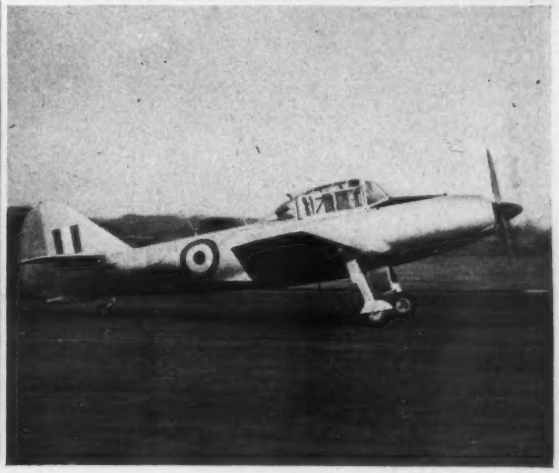
Vickers Viscount

ternal tanks, though these, obviously, will be necessary if the ultimate range is to be achieved. From a superficial examination of the N.7/46 it appears that wing-tip tanks, similar to those favoured in America, and already standardized on the Lockheed Shooting Star and Republic Thunderjet, may be required.

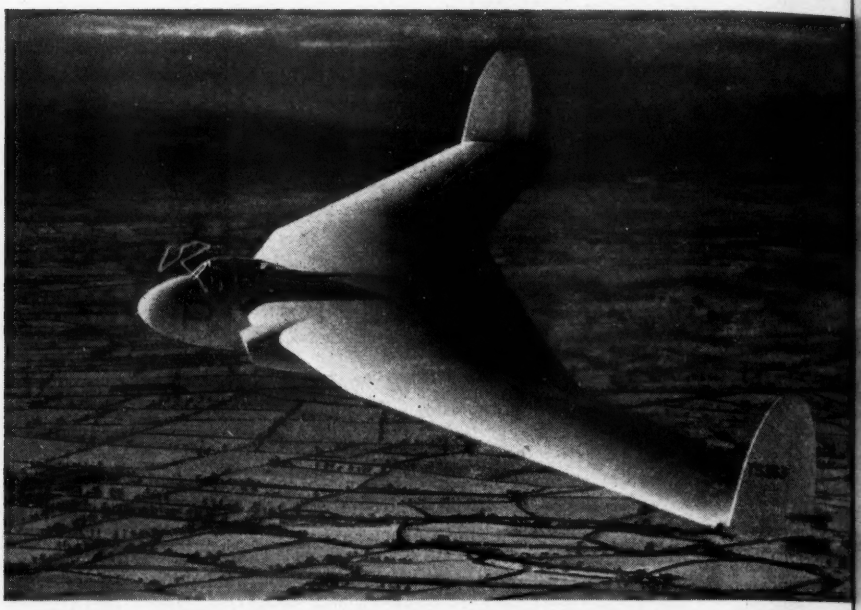
Of the three research aircraft—the A.W.52 twin-jet flying wing, D.H. high-altitude Ghost-Vampire and D.H.108 semi-tailless aerodynamic research machine—it can be said that, remarkable as they are in their own right, they are merely the exploratory vanguard of wonders yet to come.



D.H. 108. *Right) Balliol I and below it the Avro Athena I.*

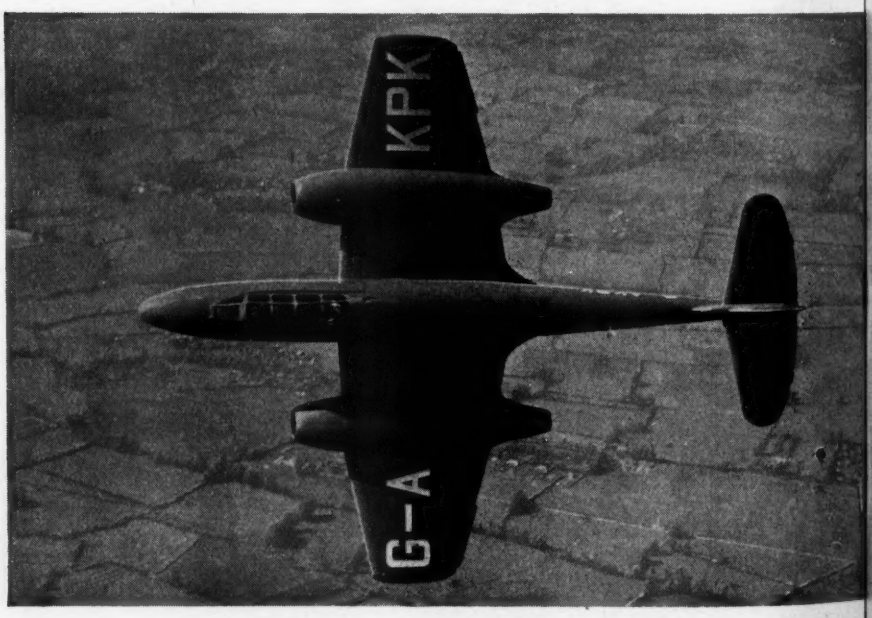


TEN WITH TURBINES



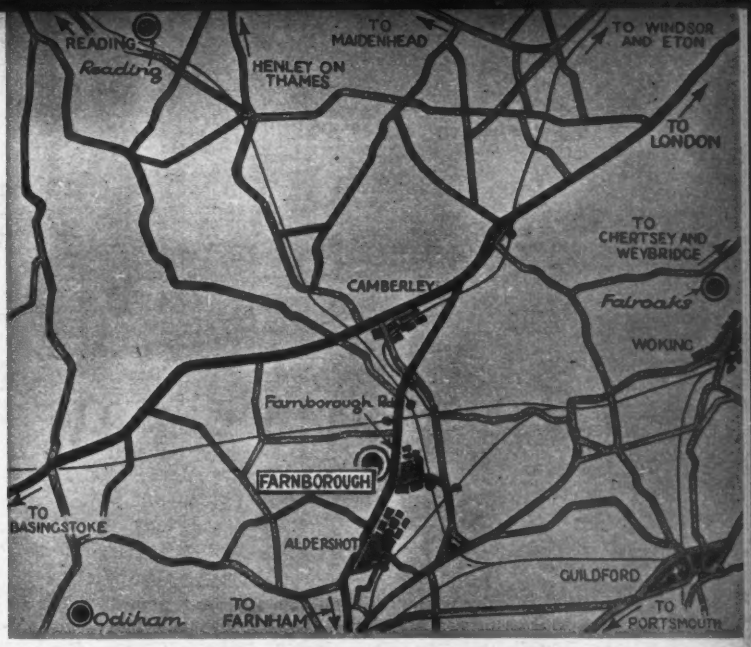
An ethereal study of the first A.W. 52 flying-wing research aircraft. This particular machine is fitted with Rolls-Royce Nenes, but the second has Derwents.

Powered with a de Havilland Ghost turbojet in place of the standard Goblin, this long-span Vampire is the actual aircraft which, flown by Mr. John Cunningham, reached the world's record height of 59,492ft. Its somewhat austere appearance is due to the absence of paint, each pound of which was found to be worth 2ft of height. Standard production Vampires have the D H. Goblin turbojet, delivering 3,000—3,500 lb static thrust. The Rolls-Royce Nene is also fitted.



Excelling even the Mark 4 Meteor in rate of climb (and, possibly, in speed also, since a higher Mach Number might be permitted by the longer nose) the Gloster Meteor T.7 jet trainer is seen over the verdant Gloucestershire countryside. Except for the fuselage nose section the T.7 is similar to the fighter, and is similarly powered by Rolls Royce Derwent 5s.

FARNBOROUGH ARRANGEMENTS



Dates, Routes, Prices, Catering and Parking Details

THAT the Society of British Aircraft Constructors will hold its Ninth Flying Display and Exhibition at Farnborough from September 7th to 12th inclusive is by now generally known, this most important event having been thoroughly publicized throughout the country. The detailed information on this page is given in the hope that it will facilitate travel and contribute in some measure to the enjoyment of what promises to be a milestone in the progress of the British aircraft industry.

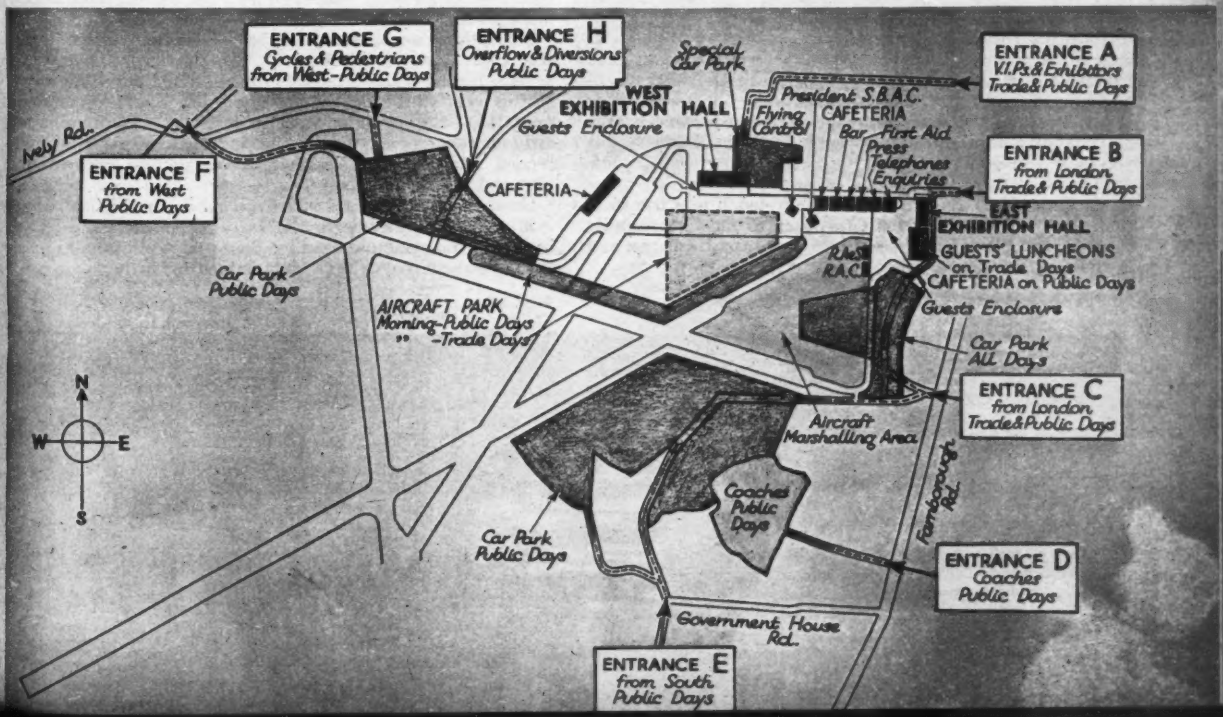
On the first four days (September 7th-10th) admission will be by invitation of the Society only. The public will, however, be admitted on Saturday, September 11th (10.30 a.m. to 5.30 p.m.) and on Sunday, the 12th (1 p.m. to 5.30 p.m.). Sunday morning has very properly been set aside for the staff of the Royal Aircraft Establishment and their friends.

On trade days, aircraft will be parked without barriers around them, and guests will be able to make a close inspection of them. In the afternoon, the machines will be moved to the marshalling area before taking their places in the flying display. On the public days the aircraft will be parked outside the public enclosures, and will be behind barriers, but visitors will be able to obtain a fairly good view of them before they are transferred to the marshalling area prior to taking off.

The price of admission will be 2s 6d for pedestrians and £1 and £4 for cars and coaches respectively, regardless of the number of occupants, who are not required to pay individual entrance. All car-parking facilities are within the airfield boundaries, and applications for tickets and car stickers should be made to National Car Parks Ltd., 5, Broadbent St., W.1. On the public days only, there will be a shuttle bus service from Ash Vale, Farnborough North and Farnborough railways stations. To these stations, from Southern Region stations of British Railways, cheap day tickets will be available.

On the "trade" days, only entrances A, B and C will be used, but on public days all entrances will be operative. Entrance A is for V.I.P.s and exhibitors only.

The two Exhibition Halls will be continuously open on both public days. The aircraft will be lined up for inspection and there will be a three-hour flying display each afternoon, starting at 2.30 p.m. Meals and refreshments will be available throughout.



A Year of Noteworthy Progress and Outstanding Achievements by Our Turbines.

BRITAIN'S POWER UNITS

THERE is little doubt that in the design of aircraft power units this country leads the world. At Farnborough this year the manufacturers will seek to substantiate this claim, and the many thousands of visitors—some 50 countries are expected to be represented at the S.B.A.C. Display—will not have to depend on the printed or spoken assurance, but will be able to see for themselves the variety and excellence of the engines we have produced.

To-day, fighter aircraft require very high power coupled with reliability and good installation qualities. Aircraft designers have been able to choose between the Nene and Ghost, both compact 5,000-lb-thrust units with centrifugal compressors, and, for twin-engined installations, the smaller but similar Derwents (3,600-lb-thrust) and slim axial 3,850lb Beryls.

It may be assumed, moreover, that more powerful developments of these units and additional larger designs are being produced for prototype aircraft now on the way. Certain advanced civil transports are also being fitted with these pure-jet units.

No better example of reliable service from a gas turbine under all circumstances can be offered than that given by the Goblin installed in the Vampire—now a standard interceptor in many countries.

For piston engines in the large 2,000 to 3,000 h.p. class we are dependent for both civil and military requirements upon one type only, but this, the Centaurus, now has a great deal of operational experience behind it.

Although its wisdom has been questioned, the policy of introducing turboprops, as soon as possible, for commercial as well as military use, when the power requirement is in excess of 3,000 h.p., is well supported in the aircraft industry. As a start, the Theseus is amassing hours of air experience and has already achieved a remarkable degree of reliability and durability, as witnessed by its recent 500-hour test run. Of great importance also was its low consumption recorded on this occasion, namely, 0.65 lb/b.h.p./hr. Now the rather similar 3,500 h.p. Proteus is under intensive development in order to reach a suitable stage for installation in the second Bristol 167 Brabazon and in the Saunders-Roe 45.

In the next lower power class, 1,000 to 2,000 h.p., we are well served for civil and military transport requirements by the many marks of Merlin, Hercules and Griffon piston engines, and no fewer than three small turboprops, the Mamba, Dart and Naiad, are now flying in test beds and in single- and four-engine prototypes.

For light transports Leonides radials and supercharged in-line Gipsy Queens are available. The Leonides has also been developed as a helicopter power plant. This class will soon be reinforced by the new Grenadier, which has reached the test and development stage and follows in its series the smaller Bombardier now awaiting type test confirmation.

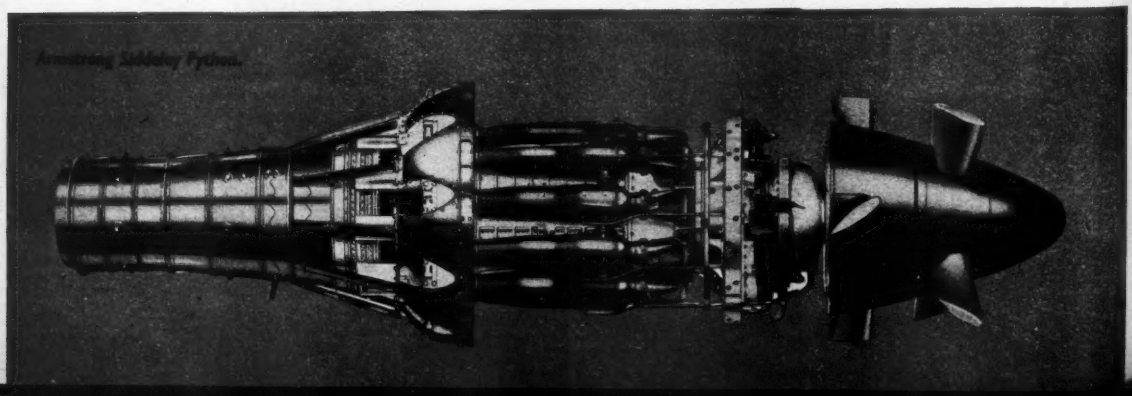
There is something of a gap between the 500s and 1,200s, and, casting one's mind back to pre-war days for a moment, it seems a pity in many ways that the successful Aquila and Gipsy Twelve designs were discontinued.

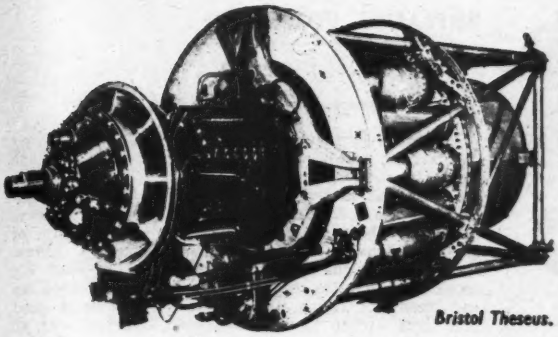
Light aircraft users need no introduction to the Gipsy Major, which has for many years enjoyed an unrivalled and world-wide reputation, or to the Cirrus Minor, an example of which recently won a race after having completed 1,200 hours of flying in the aircraft on an endurance test, without any servicing whatever.

It is to be hoped that the sponsors and designers of certain ultra-light aircraft engines—the Cross and others—construction of which has been commenced or is contemplated, will receive sufficient encouragement and support to enable them to introduce by next year designs in the 50 h.p. class, which is at present unrepresented.

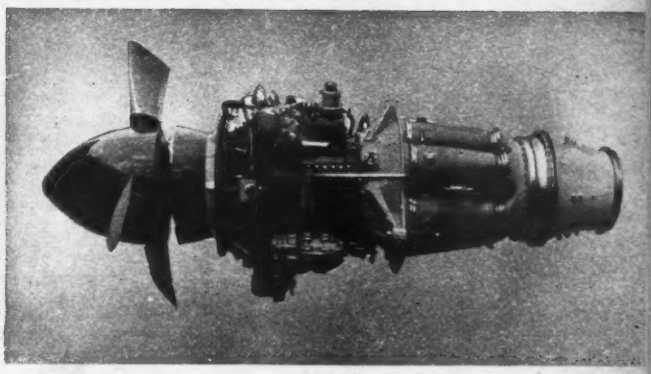
No entirely new power units have been introduced during the year, but as development has proceeded details of several have become available for the first time. The story of this year's progress centres upon many achievements in operation—the passing of type tests, the completion of arduous special test runs, the taking of the world's altitude record and the first Atlantic crossing by gas-turbine-powered aircraft.

On the following pages each type of current British engine is illustrated and its particular features and duties are summarized; the principal data are then printed in tabular form on subsequent pages with data tables for British aircraft.





Bristol Theseus.

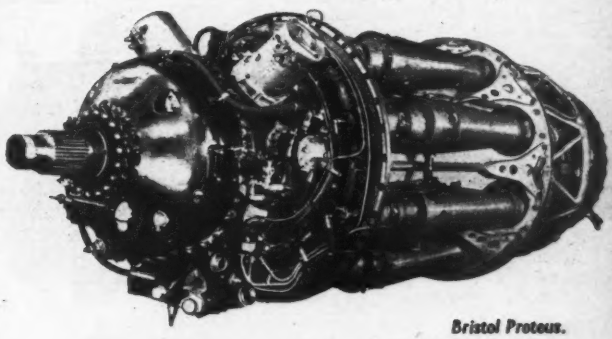


Armstrong Siddeley Mamba.

Armstrong Siddeley Mamba and Python

TWO rather different types of Mamba are at present under development, the one for military installations, the other for civil aircraft such as the Armstrong Whitworth Apollo. The main difference between the units lies in the reduction gear and torquemeter design, but the mounting and accessory arrangements are also dissimilar. The past year has been most important for the Mamba, which, after initial flight development in the nose of a four-engined flying test bed, has been installed and has flown in two advanced trainers—the Balliol and Athena. The Mamba remains one of the most compact aircraft units ever produced, and intriguing possibilities for coupled Mambas or a pure-jet version suggest themselves. Very recently a Mamba succeeded in passing a most arduous 500-hour sealed test run.

Although the design of the Python based on the pure-jet A.S.X. was well advanced before the Mamba was started, the development of the basic unit which develops nearly four times the power of the Mamba, and subsequently of the power plant complete with contra-rotating airscrews, has called for a great deal of time and energy. Difficulties are now believed to have been overcome, and two Pythons installed in the outboard positions of a four-engined test bed are expected to fly within the next few weeks. At least one single-engine installation is also in view.

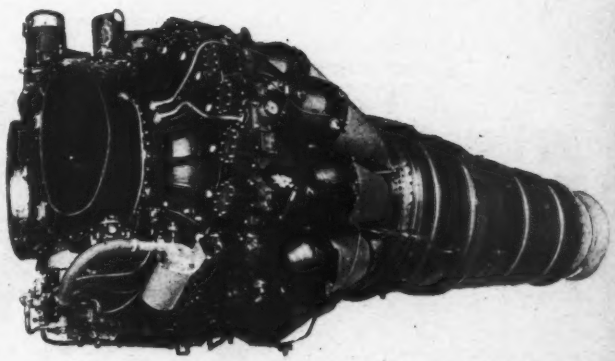


Bristol Proteus.

Bristol Theseus and Proteus

ONE of the outstanding events associated with aircraft gas turbines was the successful 500-hour run completed recently by a Theseus. Its achievement was the more important in coming at a time when doubts were being felt in some quarters with regard to the desirability of depending upon propjets for several important new civil transports. It will be remembered that the Theseus is unusual in being, in effect, a double engine, the one turbine driving the compressor and, completely separate, the other driving the airscrew.

Sufficient information has now been released concerning the Proteus, and, in particular, its coupled installations in the Brabazon and S.R.45, for the magnitude of these projects to be realized. Each pair of units driving through a common gear box will deliver a total of some 7,000 s.h.p. to the two independent airscrews. The Proteus is similar in many respects to the smaller Theseus, and flight experience with the Theseus, both in test beds and in Lincolns delivered to Transport Command, will be applicable in part to the Proteus.

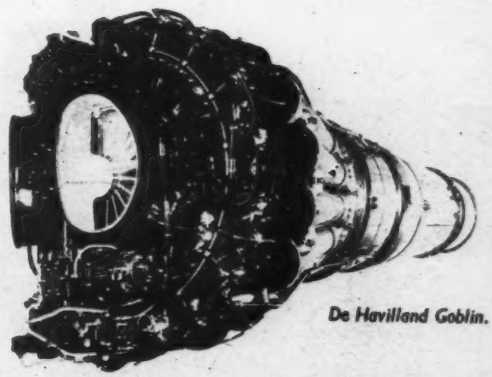


De Havilland Ghost.

De Havilland Goblin and Ghost

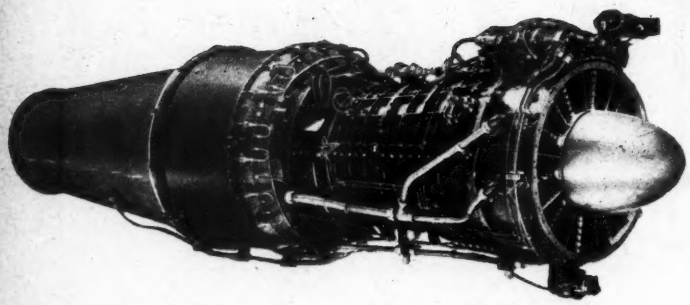
ANOTHER gas turbine power unit to figure in the list of outstanding achievements of the year is the Goblin. Not only is this turbojet flown in military aircraft in at least five countries, but it has been instrumental in obtaining the 100-km closed-circuit record and in making the first gas-turbine-powered flight across the Atlantic. As a unit it quite recently passed successfully the most arduous series of tests of 1,000-hour duration, to which an aircraft power unit has ever been submitted.

The Ghost may be regarded as having reached an advanced stage in its development, and as the power unit of a special Vampire fighter, it set up a new altitude record for aircraft of almost 60,000ft. A full type test certificate has been issued for the Ghost, four of which will power the D.H.106 Comet, one of the most important civil aircraft now under construction. Goblins are being built under licence in Sweden, and later an agreement may be made for the building of Ghosts.



De Havilland Goblin.

BRITAIN'S POWER UNITS . . .

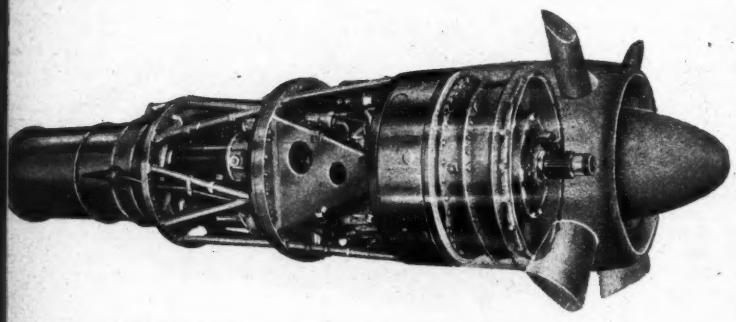


Metrovick Beryl. Two are installed in the S.R/A1 fighter.

Metropolitan-Vickers Beryl

THE only British turbojet flying with annular combustion chamber and axial-flow compressor, the Beryl, has undergone further flight development during the year and in twin installation has flown in prototypes of the S.R/A1 fighter flying boat. The power rating has been raised to the full design figure of 3,850 lb thrust. Research continues both with new Metrovick designs and with the unique F.3 and F.5 projects, which are respectively fitted with ducted fan and open fan thrust augmenters. Particularly good fuel consumption figures have been achieved with all three units.

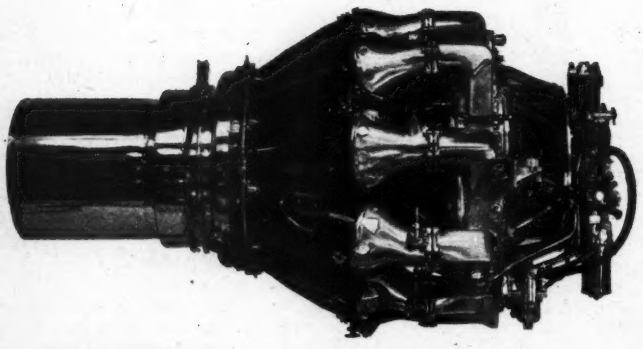
In the S.R/A1 the aircraft accessories are mounted on remote gear boxes beneath the main air intakes.



Napier Naiad airscrew-turbine with ducted spinner air intake.

Napier Naiad

IT is almost exactly a year since the Naiad propjet made its first appearance, and in the intervening period full details of its design and construction have become available and the first unit has been installed in the nose of a four-engined test bed for the commencement of flight development. Several installations have been proposed for the Naiad, and coupled units have been mentioned. In spite of its 1,500 s.h.p. output, the Naiad can boast the smallest overall diameter among all British gas turbines. In order to ensure that sufficient air can enter through the very small intake area available on an engine of such small diameter, a ducted spinner intake has been developed on which the airscrew blade roots are also carefully faired to avoid interference with the air stream.



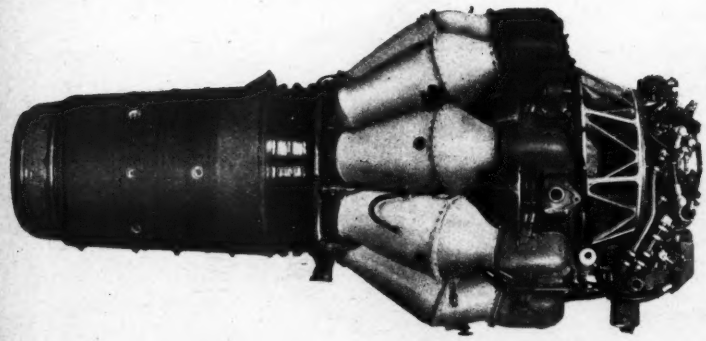
The Rolls-Royce Derwent V, two of which power the Meteor fighter.

The Rolls-Royce Nene as built in Britain, America and France.

Rolls-Royce Nene and Derwent

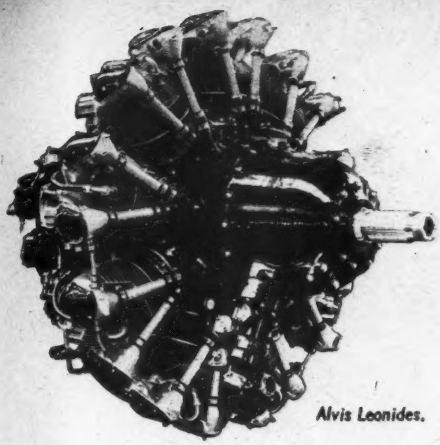
STILL retaining its position as the outstanding military power unit of the world, the Rolls-Royce Nene is now to be found in the majority of our fighter prototypes, not to mention at least one important American design. Nenes are being built under licence in America and France. As a result of intensive development, both economy and overhaul life of the Nene have been increased, and although it already delivers 5,000 lb thrust, this figure may be regarded as well within the capacity of the latest Nenes. In addition to its military applications, two Nenes are installed in the Viking which thus becomes the first pure-jet air transport. Pairs of Nenes are also being installed in the Tudor VIII for research.

It would not be incorrect to regard the Derwent 5 as a small version of the Nene, and, in fact, these units are very similar in design, the Nene having been developed from the early Derwents, and the Derwent 5 having followed the Nene. Both are stocky units having centrifugal compressors with double-sided impellers and a single turbine stage. From the military point of view Derwents are of great importance to this country as the power units of the Gloster Meteor 4s, large numbers of which are now flowing into R.A.F. service. Interesting buried installations of Derwents may be seen in the second A.W.52 research aircraft.



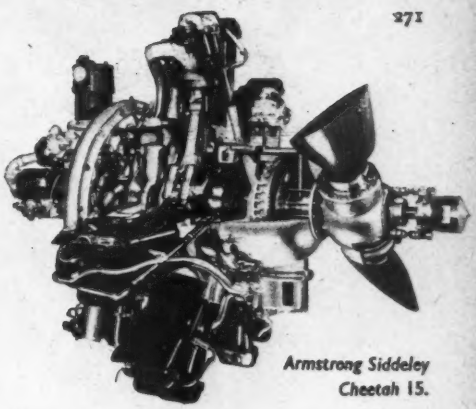
Rolls-Royce Dart and Clyde

IN view of their other important commitments the Rolls-Royce company have been compelled to give somewhat lower priority to their turboprop designs. For this reason little more will be heard of the Clyde at least for the time being, and the Dart will not be seen at Farnborough, except for the four experimental units installed and flying in the Vickers Viscount. Darts have been specified as alternative power units for the Balliol and Athena trainers, but it is unlikely that more than one or two will be produced for development and research work. Like its competitors, the Dart is flying experimentally in the nose of a four-engined test bed. Both Clyde and Dart turboprops are understood to have completed trial type test runs.



Alvis Leonides.

Leonides helicopter power plant.



Armstrong Siddeley Cheetah 15.

RECIPROCATING ENGINES

Alvis Leonides

THERE now exist several marks of Leonides for use in both conventional aircraft and helicopters. However, the units are basically similar and differ only in reduction gear and accessory arrangements. One helicopter power plant has been developed to run horizontally. During the past year Leonides engines have flown in a number of important new aircraft, in particular the Bristol helicopter, the Fairey Gyrodyne and the Percival Prince. As a result of redesigning the exhaust system, Leonides power plants as supplied for the Prince are now particularly quiet in operation. Leonides engines offer almost all the refinements of the large civil power plants in a unit of moderate power output.

Armstrong Siddeley Cheetah

NOW in its 18th year of life the Cheetah design is likely to fly for many more years to come. A new order for Avro Anson 20 trainers powered with Cheetahs, and continued production of the civil equivalent, the Avro XIX would ensure this even if the very many earlier Consuls, Oxfords, Ansons and XIXs were to cease operation. Few modifications have been necessary since the introduction of the most recent Marks, the 15 and 25, upon which provision was made for the latest types of accessory and airscrew.

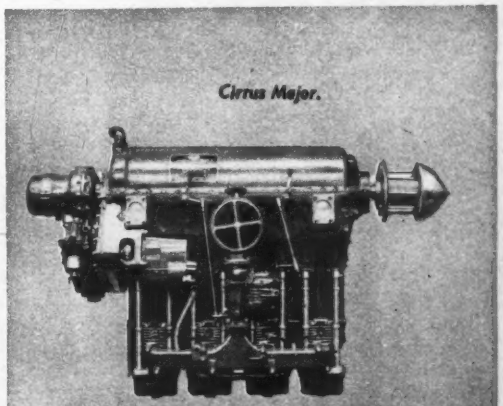
The current Cheetahs are moderately supercharged, and the Mark 25 differs only in being designed to give a considerably higher power output for short periods for take-off.

Blackburn Cirrus Major, Minor, Bombardier and Grenadier

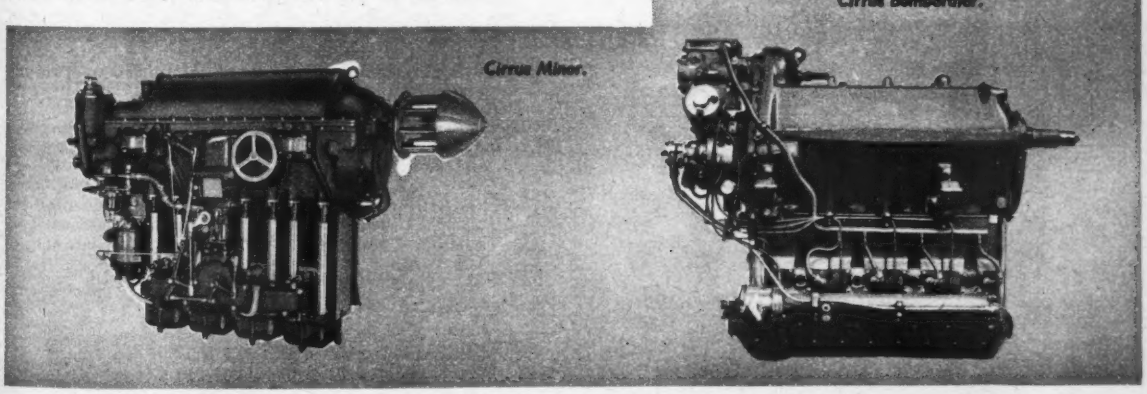
TWO newly introduced aircraft engines which are likely to prove most important are the Bombardier and Grenadier. They are entirely different from the well-known Minor and Major series, but they extend logically the power range of Blackburn units at the upper end, the figures for output being respectively 100, 145, 180 and 310 b.h.p. Cirrus Majors and Minors continue to power a number of British light aircraft, and the first Bombardier has been experimentally installed for its flight trials in a Messenger.

The four-cylinder Bombardier is unusual in its class in having direct fuel injection and valves operated by an underhead camshaft. The six-cylinder Grenadier is similar in most respects to the Bombardier, but is supercharged and may carry a reduction gear. Both engines have reached an advanced stage of development and it is expected that the Bombardier will shortly secure its type test certificate. Particular attention is being paid to the neat, fully-screened integral ignition system and to the arrangement of accessories. Provision is made in the design for the withdrawal of the accessory drive casing as a unit, without disturbing the individual drives. A third member of this new series has been designed and named the Musketeer. It is a 265 h.p. unsupercharged, direct-drive six-cylinder type. Development of the other two units will, however, take priority.

The Grenadier will be particularly suitable for installation in two-, three- or four-engined feeder line transports.

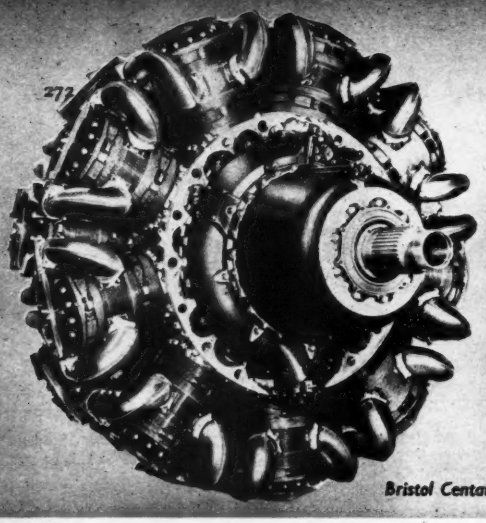


Cirrus Major.

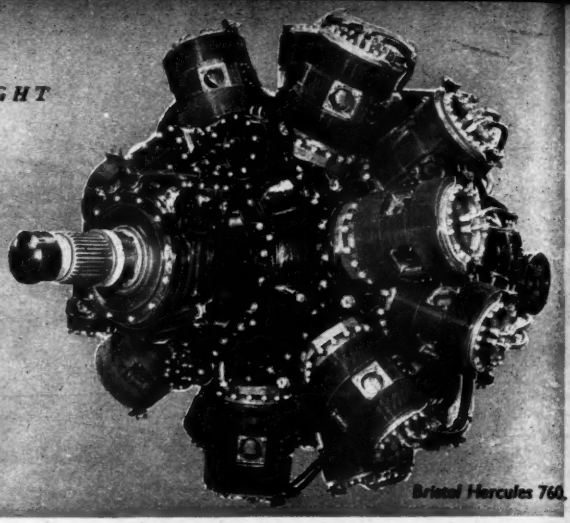


Cirrus Minor.

Cirrus Bombardier.

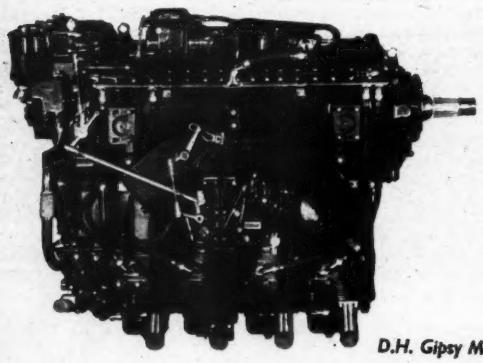


Bristol Centaurus 57.

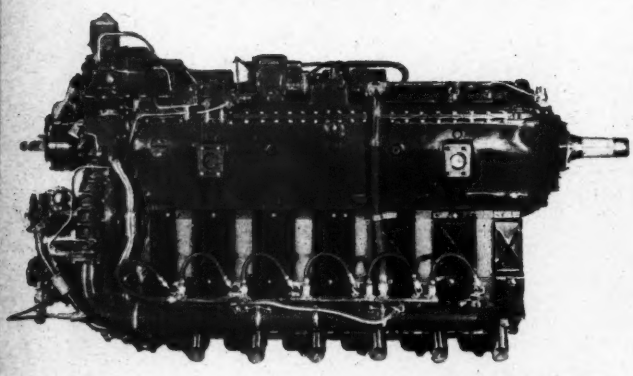


Bristol Hercules 760.

BRITAIN'S POWER UNITS . . .

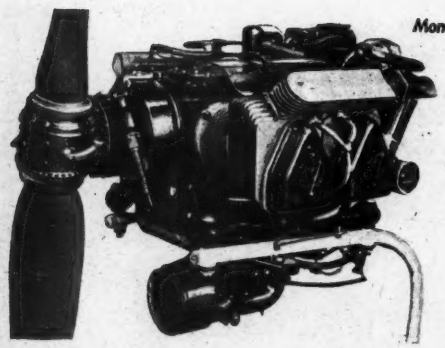


D.H. Gipsy Major 30.



D.H. Gipsy Queen 50.

Monaco Flat Four.



Bristol Hercules and Centaurus

THE large Bristol sleeve-valve radials, the Hercules and Centaurus, are the mainstay of our civil and military transport power plant programme. There are many marks of Hercules, but all are basically similar in design, the differences being in the number of stages of supercharging, the take-off power, and details, such as the fitting of torquemeters and the type of engine mounting. The stepping-up of power output since the early Hercules designs has been quite remarkable, and to obtain the highest take-off rating of 2,300 h.p. quoted for the Hercules 760 series, which are specified for Hermes IVs, considerable strengthening-up of the power section and improvement in cooling arrangements has, of course, been necessary. For the slower freighter-type aircraft the free-exit cowling has been designed to enable full power to be taken from the engine at low forward speed without overheating.

With the aid of water methanol injection the Centaurus gives almost 3,000 h.p. for take-off. Current civil Centauruses are medium-altitude units with single-speed superchargers and fuel spray petrol injection into the air intakes, but two-speed-supercharged civil engines have reached an advanced stage of development.

De Havilland Gipsy Major & Gipsy Queen

THE last twelve months has seen the introduction in considerable numbers of the latest series of Majors and Queens, namely, the Major 30, and the Queen 30, 50 and 70. In addition, the latest of the earlier line of Majors, the Major 10, has found favour in many quarters, particularly when equipped with the D.H. hand-operated v.p. airscrew. The series 30 Majors differ visibly from the 1s and 10s, particularly in the air intake, ignition and accessory arrangement. They do, in fact, appear to be a smaller version of the Queen. The supercharged 50, which is to give almost 200 h.p., is still in the development stage.

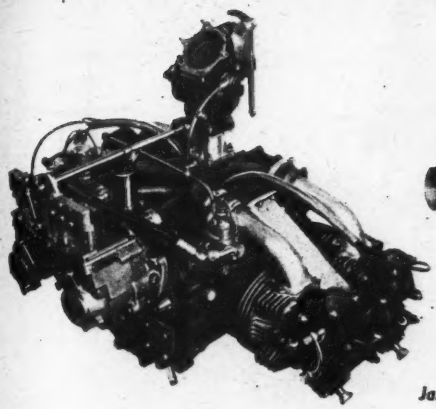
Geared and supercharged Queen 70s as found in the Dove, are well established, as are the 30 Series fitted to Prentices. The supercharged 50, which is without reduction gear, has recently made a first appearance in the Prentice T. Mk. 2. It needs no expert to see that the latest series of these well-known de Havilland engines are up to date in every way.

Jameson

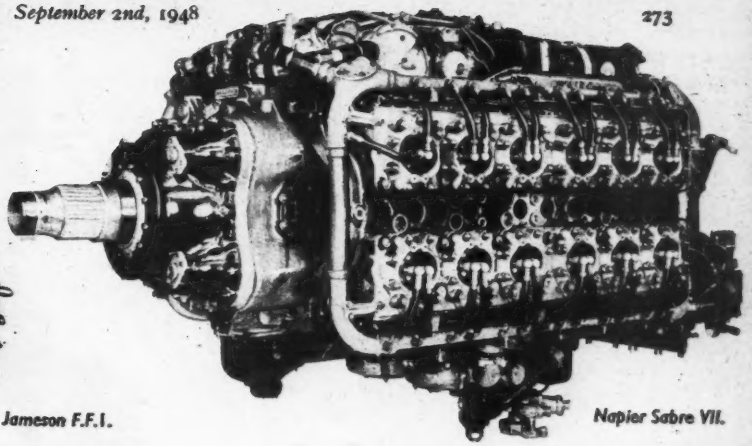
DEVELOPMENT of this light, horizontally-opposed four-cylinder engine has continued along two separate lines: the one in accordance with early plans for a high degree of reliability and exceptionally low fuel consumption, the other with the additional aim of producing a light helicopter power unit for the Skeeter. A pair of magnetos are mounted at the rear and the carburettor on top of the crankcase. The design of the induction pipes is of particular interest. There has been a slight change in the power rating and 106 b.h.p. is now delivered at 3,050 r.p.m.

Monaco

ALTHOUGH the present is a rather unpropitious time for the development and first introduction of light aircraft engines, work on the Monaco flat four has continued, and as soon as the unit becomes available, there will be plenty of opportunity for installations. Despite the fact that the horizontally-opposed design is favoured in many countries abroad, there are only two examples in the 100-h.p. class in this country. The Monaco is approaching the stage at which flight development can commence. Its 70 h.p. for cruising should be very suitable for light two-seat aircraft designs.



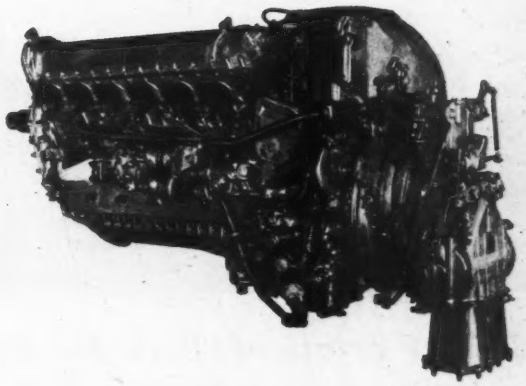
Jameson F.F.I.



Napier Sabre VII.

Napier Sabre

SINCE its first introduction as the most powerful piston engine produced in this country at that time, the extraordinarily compact and intricate Sabre design has continued to intrigue all who see it. The Sabre VII is still the most powerful liquid-cooled piston engine to be produced in large numbers in Britain and with water/methanol injection it gives 3,000 h.p. for take-off. These primarily military units are, however, in a power class which is rapidly being superseded by gas turbine designs. Unofficial mention has been made of the name of at least one later-type engine in addition to its turboprops in which the company is interested. No details have as yet been released but it is understood to be of the compounded type.



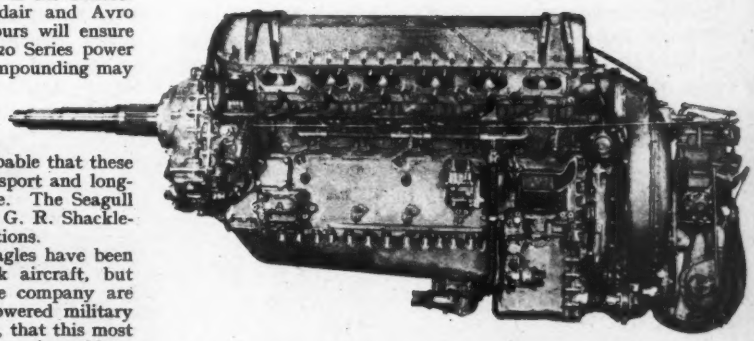
Rolls-Royce Merlin.

Rolls-Royce Merlin, Griffon and Eagle

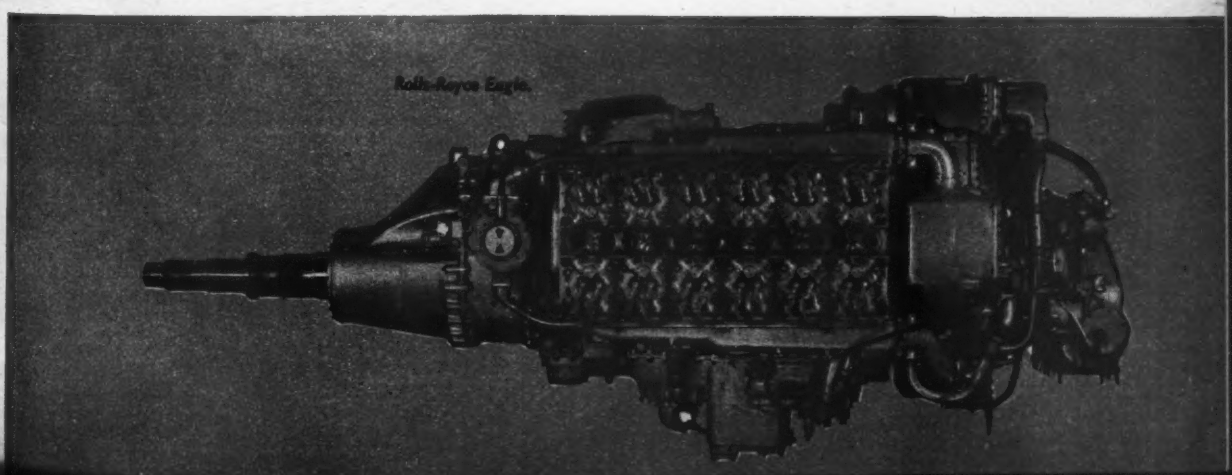
ALTHOUGH in a period of about twelve years the maximum power output of the Merlin has been almost doubled, there is still room for the further development of civil versions of this outstanding engine. As is well known, it was originally designed for our first-line fighters and light bombers of 1939 and 1940, but an enormous number of hours of civil operational experience has now been amassed, both in the bomber conversions and, more particularly, in Canadair and Avro transports. The recent order for Canadair Fours will ensure many more operational years for the Merlin 620 Series power plants, and it is possible that some form of compounding may be introduced in the future to augment power at altitude and improve fuel consumption figures.

A number of important military aircraft are still powered with Griffon engines, and it is probable that these units will continue to be installed in some transport and long-range reconnaissance-type aircraft in the future. The Seagull reconnaissance amphibian and the four-engined G. R. Shackleton offer two examples of recent Griffon installations.

Small numbers of the 24-cylinder H-form Eagles have been built for the Westland Wyvern Naval attack aircraft, but because of their gas turbine power units, the company are unlikely to proceed further with these high-powered military piston engines. It has been suggested, however, that this most powerful British piston engine (3,500 b.h.p. max.) could be developed for civil purposes should a need arise.

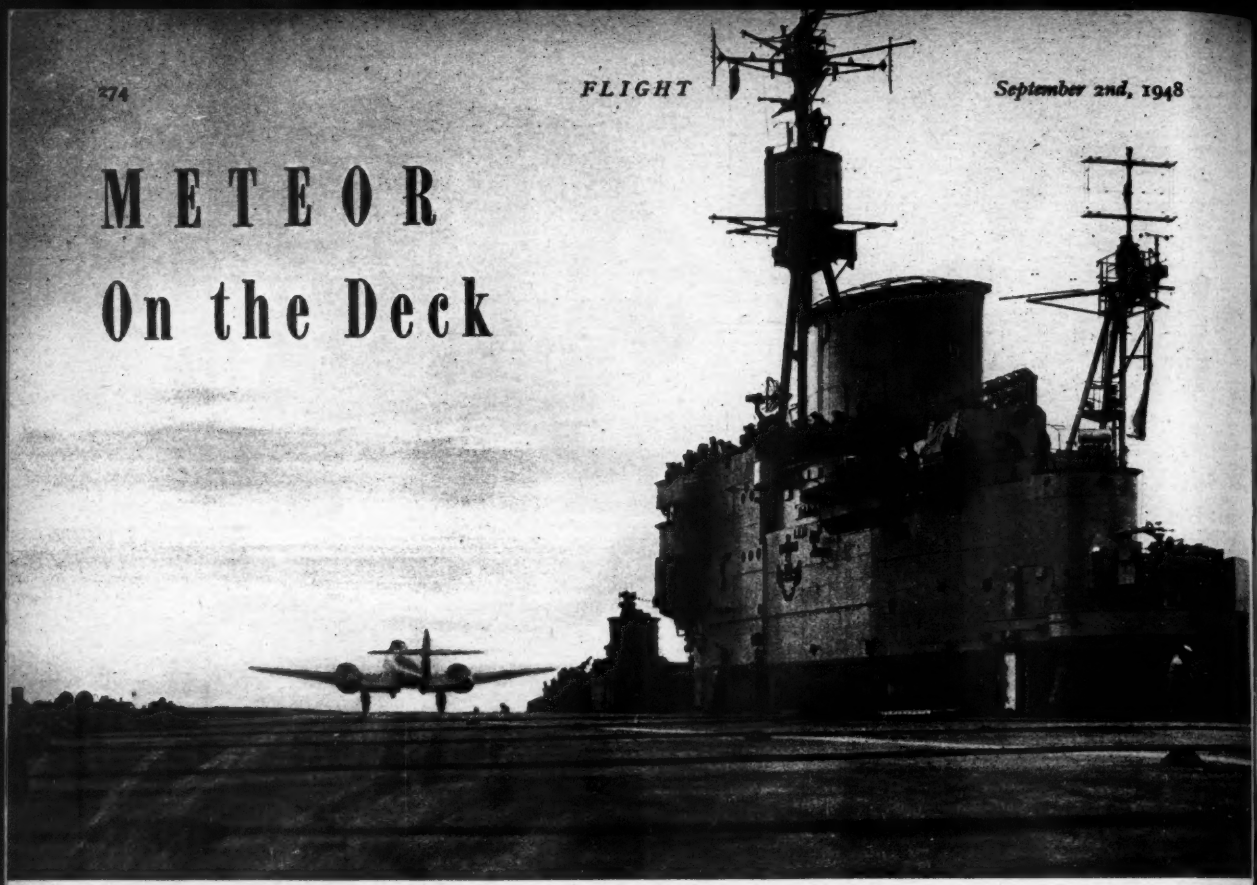


Rolls-Royce Griffon.



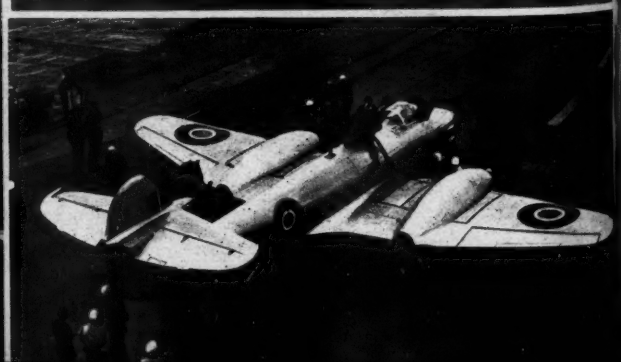
Rolls-Royce Eagle.

METEOR On the Deck



Initial Trials of Twin-Jet Fighter from H.M.S. "Implacable"

THE "sea change" as suffered by the Gloster Meteor, seen in the accompanying views of deck-landing and take-off trials aboard the aircraft carrier *Implacable*, is a retrogressive one in that the airframe is a Mark 3, with long-span wings, and the nacelles are of the old short type. These characteristics are, however, unimportant and detracted little from the value of the trials, which were concerned principally with handling technique. Restrictions are imposed on level speed but with two Derwent 5s this Naval research aircraft climbs at a phenomenal rate.



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BRITISH CIVIL AIRCRAFT

(Compiled by "Flight." Copyright)

Make and Designation	General Category	Power Plant	Max Power (or Thrust) at Height (ft)	Span (ft) (in)	Length (ft) (in)	Wing Area (sq ft)	Normal Gross Weight (lb)	Max Speed at Height (m.p.h.) (ft)	Max Cruising Speed at Height (m.p.h.) (ft)	Initial Rate of Climb (ft/min)	Loads and Ranges: Payload (lb)	No. of Passengers	Range at (miles)	Speed at (m.p.h.)	Height at (ft)	Remarks
HEAVY TRANSPORT AIRCRAFT																
Avro Tudor III ...	Long-range "V.I.P." transport	4 Rolls-Royce Merlin 621	6,620 h.p. 16,750	120 0	79 3	1,421	78,760	Well over 300 m.p.h.	282 20,000	800	3,130	10	4,000	210	10,000	Day and night accommodation for 8 passengers.
Avro Tudor IV ...	Long-range transport	4 Rolls-Royce Merlin 621	6,620 h.p. 16,750	120 0	85 3	1,421	80,000	Well over 300 m.p.h.	282 20,000	800	10,504	32	2,910	210	10,000	Max range is 4,000 miles.
Bristol 167 (Brabazon I, Mark 2)	Long-range transport	8 Bristol Proteus	28,000 e.h.p. approx	230 0	177 0	5,317	291,200 approx	Well over 300 m.p.h.	—	—	—	100	—	—	—	Prototype (Mk. 1) will fly with Centaurus piston engines.
General Aircraft Universal	Short-range transport	4 Bristol Hercules 761	8,000 h.p. 15,500	162 0	99 0	2,916	95,000	240 13,500	170 8,000	—	21,730	—	1,455	170	8,000	Aircraft can be adapted for 90 passengers and 7,000lb of baggage or freight.
Handley Page Hermes IV	Medium/long-range transport	4 Bristol Hercules 763	8,000 h.p. 15,500	113 0	97 0	1,408	82,000	357 20,000	298 24,000	1,020	13,700	40	2,000	298	25,000	Max range 3,500 miles.
Handley Page Hermes V	Medium-range transport	4 Bristol Theseus 763	8,000 h.p. 15,500	113 0	97 0	1,408	84,000	351 15,000	342 25,000	1,950	13,600	40	2,000	335	30,000	Max range 2,820 miles.
Handley Page Hermes VI	Medium/long-range transport	4 Bristol Hercules 763	8,000 h.p. 15,500	113 0	97 0	1,408	82,000	357 20,000	298 25,000	1,080	15,800	40	2,000	298	25,000	Max range 3,940 miles.
Saunders-Roe S.R.45	Long-range transport flying boat	10 Bristol Proteus	35,000 e.h.p. approx	219 6	146 0	—	292,300 approx	Over 350 m.p.h.	—	—	—	Up to 100	See Remarks	—	—	Max range 5,000 miles.
Short Solent ...	Medium/long-range transport flying boat	4 Bristol Hercules 637	7,180 h.p. 7,250	112 9	89 5	1,687	75,000	268 7,200	247 4,700	916	10,400	30	1,817	207	—	Max range (11 passengers), 3,162 miles.
MEDIUM TRANSPORT AIRCRAFT																
Airspeed Ambassador	Medium-range transport	2 Bristol Centaurus 661	Engines initially de-rated	115 0	81 3	1,200	52,000	—	312 21,500	1,570	9,195	40 See Remarks	1,750	240	20,000	40 passengers and luggage weigh 8,360lb.
Armstrong Whitworth Apollo	Medium-range transport	4 A.S. Mamba	4,580 h.p. sea level	92 0	70 11	986	36,998	—	305 12,500	2,100	7,500	24-31	1,000	305	20,000	Max range is 1,500 miles.
Armstrong Whitworth Apollo	Medium-range transport	4 Rolls-Royce Merlin 35	4,980 h.p. 11,500	92 0	70 11	986	43,150	—	305 10,000	2,040	7,500	24-31	1,000	290	20,000	Max range is 1,520 miles.
Bristol New-Type 170	Short/medium-range transport	2 Bristol Hercules 638	3,590 h.p. 7,250	108 0	68 4	1,487	40,000	224 6,500	207 4,500	1,080	8,000 See Remarks	—	1,270	162	5,000	Range and load figures apply to Freighter.
Vickers-Armstrongs Viking IB	Medium-range transport	2 Bristol Hercules 634	3,590 h.p. 7,250	89 3	65 2	882	34,000	304 10,000	263 10,000	1,275	See Remarks	24-27	1,700	210	10,000	Total disposable load is 10,750lb.
Vickers-Armstrongs Nene-Viking	Short-range transport (experimental)	2 Rolls-Royce Nene	10,000lb sea-level static	89 3	65 3	882	34,000	408 10,000	393 10,000	See Remarks		24-27	310	393	10,000	Climbs to 10,000ft in 3 mins.
Vickers-Armstrongs Viscount	Medium-range transport	4 Rolls-Royce Dart	4,000 h.p.+ 1,300lb static	89 0	74 6	885	40,500	331 20,000	See Remarks	1,675	See Remarks	32-36	1,725	276	20,000	Recommended cruising speed is 276 m.p.h. at 20,000ft. Total disposable load is 13,050lb.
Vickers-Armstrongs Viscount	Medium-range transport	4 Napier Naiad	6,000 h.p.+ 960lb static	89 0	74 6	885	43,500	370 25,000	See Remarks	1,850	See Remarks	32-36	1,725	316	25,000	Recommended cruising speed is 316 m.p.h. at 25,000ft. Total disposable load is 15,800lb.
LIGHT TRANSPORT AIRCRAFT																
Airspeed Consul ...	Short-range transport	2 A.S. Cheetah 10	710 h.p. 7,000	53 4	35 4	348	8,250	175 4,800	156 6,000	1,180	975	5	640	143	10,000	Six passengers can be carried for 455 miles.
Avro XIX	Short-range transport	2 A.S. Cheetah 15	810 h.p. 4,000	56 6	42 3	440	10,400	190 5,000	175 5,000	790	1,560	8	356	155	3,000	Nine-passenger version available.
De Havilland Dove...	Short-range transport	2 D.H. Gipsy Queen 70	690 h.p. 7,750	57 0	39 6	335	8,500	210 8,000	202 8,000	850	1,812	8	500	165	8,000	Up to eleven passengers may be carried (no lavatory).
Miles Marathon ...	Short-range transport	4 D.H. Gipsy Queen 71	1,380 h.p. 7,750	65 0	52 1	500	16,500	230 6,300	200 —	1,550	2,800	18	900	175	10,000	Experimental version with two A.S. Mambas is under development.
Percival Prince ...	Short-range transport	2 Alvis Leonides	880 h.p. 8,750	56 0	42 10	365	10,650	222 5,000	185 5,000	1,050	1,760	8	800	140	10,000	Can be equipped for air survey.
Portsmouth Aerocar	Short-range transport	2 Cirrus Major 3	310 h.p. sea level	42 0	26 3	—	3,950	164 5,000	—	—	500	5	1,000	136	5,000	Floatplane version available. Bombardier engines may be fitted.
Short Sealand ...	Short-range transport amphibian	2 D.H. Gipsy Queen 70	690 h.p. 7,750	59 0	42 2	350	8,700	188 6,200	174 6,600	815	See Remarks	7	305	127	10,000	Typical payload is 7 passengers and luggage. Version with Alvis Leonides engines under development.
Sponson Tribian ...	Short-range amphibian	See Remarks	300 h.p. approx	—	—	—	—	140 approx	—	900	—	—	—	—	—	Gipsy Major or Cirrus engines.
Vickers-Supermarine Sea Otter	Short-range transport amphibian	1 Bristol Mercury 30	855 h.p. 4,500	46 0	39 9	610	10,000	150 5,000	—	795	See Remarks	4-5	510	100	5,000	Max range is 690 miles. Disposable load is 3,500lb. Wheels detachable, allowing 330lb more payload.
PRIVATE-OWNER, CLUB AND TAXI AIRCRAFT																
Auster Autocrat ...	Taxi, club or private-owner type	1 Cirrus Minor 2	100 h.p. sea level	36 0	23 5	185	1,850	120 sea level	100 sea level	568	608	3	320	100	1,000	Take-off run (5-m.p.h. wind) is 212 yds.
Auster Avis... ...	Taxi or private-owner type	1 D.H. Gipsy Major 10	145 h.p. sea level	36 4	23 6	185	2,550	113 sea level	100 sea level	520	780	4	500	100	1,000	Take-off distance (5-m.p.h. wind) is 130 yds.
Chrislea Super Ace, Series II	Taxi or private-owner type	1 D.H. Gipsy Major 10	145 h.p. sea level	36 0	21 6	177	2,342	126 2,000	112 2,000	750	780	4	Over 400	112	2,000	Range can be increased to 550 miles.
Elliott (Newbury) Eon	Taxi or private-owner type	1 D.H. Gipsy Major 10	145 h.p. sea level	37 0	25 0	173	2,350	136 1,000	116 1,000	675	—	4	—	—	—	3-seater (2,150lb) and 2-seater (1,950 lb) have increased performance.
Planet Satellite ...	Taxi or private-owner type	1 D.H. Gipsy Queen 31	250 h.p. sea level	32 6	26 3	153	2,905	208 sea level	191 2,000	1,450	880	4	1,000	—	—	Range (pilot only) is 2,450 miles. Take-off run to 50ft is 310 yd.
Slingsby Motor Tutor	Club or private-owner type	1 Aeronca-J.A.P.	37 h.p. sea level	43 4	20 10	170	790	—	60 sea level	—	—	1	200	60	1,000	May be available in kit or semi-kit form.

BRITISH MILIT

Make and Designation	Principal Functions	Power Plant	Max. Power (or Thrust) at Height	No. of Crew	Span (ft) (in)	Length (ft) (in)	Wing Area (sq ft)	Normal Gross Weight (lb)
								JET-PROPELLED
DE HAVILLAND VAMPIRE F. Mk. 3	Fighting. (See Remarks)	1 D.H. Goblin 2	3,000lb static sea level	1	40 0	30 9	250.7	12,170
DE HAVILLAND SEA VAMPIRE ... F. Mk. 20	Fighting. Bombing. Attack	1 D.H. Goblin 2	3,000lb static sea level	1	38 0	30 9	245	12,660
GLOSTER METEOR F. Mk. 4 ...	Fighting. Bombing. Attack. Reconnaissance	2 Rolls-Royce Derwent 5 ...	7,000lb static sea level	1	37 2	41 0	350	15,175 (See Remarks)
GLOSTER E.1/44	Fighting. Bombing. Attack	1 Rolls-Royce Nene ...	5,000lb static sea level	1	36 0	38 0	254	—
HAWKER N.7/46	Fighting. Bombing. Attack	1 Rolls-Royce Nene ...	5,000lb static sea level	1	36 6	38 4	—	—
SAUNDERS-ROE S.R./A1	Fighting. Bombing. Attack	2 Metropolitan-Vickers Beryl	7,700lb static sea level	1	46 0	50 0	415	16,255
VICKERS-SUPERMARINE ATTACKER	Fighting. Bombing. Attack	1 Rolls-Royce Nene ...	5,000lb static sea level	1	36 11	37 6	226	11,300
								PISTON-ENGIN
DE HAVILLAND HORNET F. Mk. 3	Fighting. Bombing. Attack	2 Rolls-Royce Merlin 130/131	3,780 h.p. at 13,750ft	1	45 0	37 0	361	21,060
DE HAVILLAND SEA HORNET ... F.R. Mk. 20	Fighting. Bombing. Attack. Reconnaissance	2 Rolls-Royce Merlin 130/131	3,780 h.p. at 13,750ft	1	45 0	37 0	361	18,530
HAWKER SEA FURY F.B. Mk. 11 ...	Fighting. Bombing. Attack. Reconnaissance	1 Bristol Centaurus 18 ...	2,280 h.p. at 16,500ft	1	38 5	34 7	280	12,030
VICKERS-SUPERMARINE SEAFIRE ... F.R. Mk. 47	Fighting. Bombing. Attack. Reconnaissance	1 Rolls-Royce Griffon 87...	2,145 h.p. at 15,500ft	1	36 11	34 4	243.6	10,200
								BOMBERS AND
AVRO LINCOLN B. Mk. 2	Bombing	4 Rolls-Royce Merlin 68 ...	6,260 h.p. at 17,250ft	7	120 0	78 8½	1,421	82,000
BLACKBURN FIREBRAND T.F. ... Mk. 5A	Bombing. Torpedo dropping. Attack. Fighting	1 Bristol Centaurus 9 ...	2,225 h.p. at 11,000ft	1	51 3½	38 11	381.5	16,000
BLACKBURN S.28/43	Bombing. Torpedo dropping. Attack	1 Bristol Centaurus 59 ...	2,610 h.p. at 14,250ft	1	44 11½	39 3½	361.5	15,280
WESTLAND WYVERN T.F. Mk. 1...	Bombing. Fighting. Torpedo dropping. Attack	1 Rolls-Royce Eagle ...	3,500 h.p. at 15,250ft	1	44 0	40 0	—	22,000
								RECONNAISSA
AVRO SHACKLETON G.R. Mk. 1...	Maritime Reconnaissance...	4 Rolls-Royce Griffon ...	Probably over 8,000 h.p.					No other particulars
DE HAVILLAND MOSQUITO P.R. Mk. 34	Reconnaissance	2 Rolls-Royce Merlin 113/114	2,860 h.p. at 27,250ft	2	54 2	44 6	454	25,500
FAIREY FIREFLY F.R. Mk. 5 ...	Reconnaissance. Attack. Bombing. Anti-submarine patrol	1 Rolls-Royce Griffon 74 ...	2,245 h.p. at 9,250ft	2	41 2	38 0	330	13,200
SHORT STURGEON Mk. 1	Reconnaissance. (See Remarks)	2 Rolls-Royce Merlin 140...	3,300 h.p. at 16,750ft	2–3	59 11	44 10	560	21,700
VICKERS-SUPERMARINE SEAGULL	Reconnaissance. Air/sea rescue	1 Rolls-Royce Griffon R.G.30 S.M.	1,680 h.p. at 6,500ft	3	50 6	44 1½	432	14,500
								ARTILLERY OBSERVATION AND
AUSTER A.2/45	Artillery observation ...	1 D.H. Gipsy Queen 34 ...	250 h.p. at sea level	2	43 6	30 1	278	—
AUSTER A.O.P. Mk. 6	Artillery observation. Cable laying, etc.	1 D.H. Gipsy Major 7 ...	145 h.p. at sea level	2	36 0	23 9	184.5	2,160
HESTON A.2/45	Artillery observation ...	1 D.H. Gipsy Queen 33 ...	250 h.p. at sea level	2	44 0	34 0	274	3,050
SCOTTISH AVIATION A.4/45 ...	Light transport	1 D.H. Gipsy Queen 32 ...	250 h.p. at sea level	4	49 9	34 9	390	4,250
								TRANS
HANDLEY-PAGE HASTINGS C. Mk. 1	Transport. Glider towing	4 Bristol Hercules 101 ...	6,500 h.p. at 19,500ft	5	113 0	81 8	1,408	75,000
VICKERS ARMSTRONGS VALETTA C. Mk. 1	Transport. Glider towing	2 Bristol Hercules 230 ...	4,110 h.p. at 3,500ft	4	89 3	65 2	882	36,500
								TRAI
AUSTER Mk. 7 TRAINER	A.O.P. training	1 D.H. Gipsy Major 7 ...	145 h.p. at sea level	2	36 0	23 9	185	2,122
AVRO ATHENA T. Mk. 1	Advanced training ...	1 Armstrong Siddeley Mamba	1,000 s.h.p. + 220lb thrust	3	40 0	36 6	270	7,478
AVRO ATHENA T. Mk. 2	Advanced training ...	1 Rolls-Royce Merlin 35 ...	1,245 h.p. at 11,500ft	3	40 0	37 6	270	8,143
AVRO ANSON T. Mk. 20	Advanced training ...	2 Armstrong Siddeley Cheetah 15	810 h.p. at 4,000ft	3–4	57 6	43 3	440	10,400
BOULTON PAUL BALLIOL T. Mk. 1	Advanced training ...	1 Armstrong Siddeley Mamba	1,000 s.h.p. + 220lb thrust	3	39 4	36 6	250	7,845
BOULTON PAUL BALLIOL T. Mk.2...	Advanced training ...	1 Rolls-Royce Merlin 35 ...	1,245 h.p. at 11,500	2	39 4	35 1½	250	8,310
BRISTOL BUCKMASTER T. Mk. 1 ...	Advanced training ...	2 Bristol Centaurus 7 ...	4,280 h.p. at 12,000ft	3	71 10	46 5	708	33,700
DE HAVILLAND CHIPMUNK ...	Primary training ...	1 D.H. Gipsy Major 1C ...	143 h.p. at sea level	2	34 4	25 8	172.5	1,900
FAIREY OPERATIONAL TRAINER...	Advanced training ...	1 Rolls-Royce Griffon 12 ...	1,665 h.p. at 11,000ft	2	44 6	37 7	328	12,000
FAIREY PRIMER	Primary training	1 D.H. Gipsy Major 10 (see Remarks)	145 h.p. at sea level	2	32 10	27 6	154.5	1,960
GLOSTER METEOR T Mk. 7	Jet training	2 Rolls-Royce Derwent 5...	7,000lb static sea level	2	37 2	41 0	350	14,000
HAWKER FURY TRAINER	Advanced training ...	1 Bristol Centaurus 18 ...	2,280 h.p. at 16,500ft	2	38 5	34 7	280	11,930
PERCIVAL PRENTICE T. Mk. 1 ...	Basic training	1 D.H. Gipsy Queen 31 ...	250 h.p. at sea level	3	46 0	31 3	305	3,950
REID AND SIGRIST DESFORD ...	Training	2 D.H. Gipsy Major 1 ...	260 h.p. at sea level	2	34 0	25 6	186	3,300
VICKERS-SUPERMARINE SPITFIRE TRAINER	Advanced training ...	1 Rolls-Royce Merlin 61 ...	1,390 h.p. at 23,900ft	2	36 10	31 4½	242	7,400

N.B.—The following contractions are employed: I.R.C. = Initial rate of climb. R.O.C. = Rate of climb.

ARY AIRCRAFT

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Max. Speed (m.p.h.) at (ft)	Climb to (ft) in (min)	Range with Typical Load (Miles)	Service Ceiling (ft)	Typical Armament (Guns)	Typical Armament (Bombs, Torpedoes or R.P.s)	Remarks
FIGHTERS						
531 20,000	I.R.C. 4,350ft/min	1,145	43,500	4×20 mm	See Remarks	The latest Vampire developments are equipped for bombing and ground attack (F.B. Mk. 5 and 6)
526 20,000	I.R.C. 4,350ft/min	1,145	43,000	4×20 mm	Provision for R.P.s or bombs	Full deck-landing equipment
585 Sea level	30,000 6.4	700	44,500	4×20 mm	2×1,000-lb bombs or 8×90-lb R.P.s	All-up weight with 705 gal. of fuel (range 1,200 miles) is 18,700lb.
Performance figures not yet available, but speed is over 600 m.p.h.				4×20 mm	Provision for bombs or R.P.s	Prototype on test.
Probably well over 600 m.p.h.	—	—	—	—	—	Land-based version is designated P.1040.
Over 500 m.p.h.	I.R.C. over 4,000 ft/min	See Remarks	—	4×20 mm	Provision for bombs and R.P.s	Prototypes on test. Typical endurance (without 280-gal auxiliary tankage) 1 hour plus time for combat, reserve and climb.
590 Sea level	30,000 6.17	410	48,500	4×20 mm	2×1,000-lb bombs or 4×300-lb R.P.s	Naval version available. Max. range with drop-tank 1,100 miles.
ED FIGHTERS						
472 20,000	I.R.C. 4,650ft/min	See Remarks	37,500	4×20 mm	Provision for bombs or R.P.s	Max. range is 2,600 miles. Standard long-range fighter of R.A.F.
467 20,000	I.R.C. 4,650ft/min	1,500	37,000	4×20 mm	2×1,000-lb bombs, or 2 mines, or 8 R.P.s.	Two-seater night fighter and strike-navigator version (N.F. Mk. 21) has been developed.
453 20,500	30,000 8.65	See Remarks	Over 40,000	4×20 mm	2×1,000-lb bombs or 12 R.P.s	Fury (land-based) is generally similar. Range over 2,000 miles.
452 20,500	R.O.C. at 17,500ft is 4,140ft/min	600 See Remarks	43,100	4×20 mm	3×500-lb bombs or various R.P. loads	Three auxiliary tanks can be fitted for extreme range.
STRIKE AIRCRAFT						
295 15,000	I.R.C. 820ft/min	2,800 See Remarks	35,000	4 0.5in 2×20 mm	14×1,000-lb or 1×22,000-lb bombs	Max. still-air range at 20,000ft is 3,380 miles.
350 13,000	I.R.C. 2,500ft/min	627	29,000	4×20 mm	1×1,850-lb torpedo, or 1×2,000-lb bomb, or 16×60-lb R.P.s	Speed quoted is without torpedo.
370 18,000	I.R.C. 2,400ft/min	See Remarks	33,500	—	Provision for bombs, R.P.s or torpedo	Prototypes on test. Best combat radius is 400 miles, with torpedo.
455	—	See Remarks	—	4×20 mm	1×20-in torpedo or 1×2,000-lb bomb, or 8×60-lb R.P.s	Endurance 3¾ hours. Folded width is 18ft.
NCE AIRCRAFT						
of this machine are yet available						Prototype on test.
425 30,000	—	3,500	Over 40,000	Nil	—	Essentially similar to night fighter and bomber variants.
386 14,000	15,000 9.6	760	31,900	4×20 mm	2×1,000-lb bombs or 16×60-lb R.P.s	Night fighter and anti-submarine variants have special equipment. Target-towing version under development.
402 19,000	I.R.C. 4,000ft/min	—	35,700	2×0.5in	1×1,000-lb bomb or depth charges.	A high-speed target-towing version is in production.
260 11,800	R.O.C. at 10,500ft is 1,100ft/min	875	23,900	Prototype is equipped for air-sea rescue duties		Range with two 60-gal drop tanks is 1,230 miles. Amphibian with variable-incidence wing.
LIGHT TRANSPORT AIRCRAFT						
Performance figures not available						Prototype on test.
124 1,000	I.R.C. 810ft/min	280	14,000	Nil	Anti-personnel bombs	Special aerofoil flaps. Armour protection.
Performance figures not available.						Prototype on test.
126 m.p.h. sea level	I.R.C. 900ft/min	500	—	Nil	Nil	Also developed for civil use (named Prestwick Pioneer). Lands in about 30 yds in 10-m.p.h. wind. Landing distance from 50ft, 180 yds.
PORTS						
354 23,700	25,000 34	2,000 See Remarks	26,700	Nil	Nil	Maximum range (2,560 gals.) is 3,260 miles.
294 3,500	R.O.C. at sea level 1,300ft/min	—	—	Nil	Nil	Take-off run to 50ft is 1,050 yds.
NERS						
122 1,000ft	I.R.C. 660ft/min	315	12,000	Nil	Nil	Structural provision for a third seat.
287 10,000	15,000 7.4	See Remarks	34,800	1×0.303in	Practice bombs	To specification T.7/45. Endurance is 2½ hours.
287 10,000	I.R.C. 2,050ft/min	See Remarks	28,000	1×0.303in	Practice bombs	Endurance 2½ hours.
171 5,000	I.R.C. 790ft/min	645	14,000	Anson T.20 has provision for bombing and gunnery training		T.Mk.21 is navigational trainer. T.Mk.22 is radio trainer.
307 20,000	I.R.C. 2,200ft/min	—	36,750	1×0.303in	Practice bombs up to 200lb	First turbo-prop. trainer to fly. Deck-landing equipment can be fitted.
305 11,500	15,000 10.64	See Remarks	32,500	1×0.303in	Practice bombs up to 200lb	Endurance is 2½ hours at 10,000ft.
352 12,000	I.R.C. 2,245ft/min	—	30,000	Nil	Practice bombs	Bears a similarity to Brigand.
143 sea level	I.R.C. 900ft/min	485	21,200	Nil	Nil	Alternative engine is Gipsy Major 10.
305 16,000	10,000 5.5	800	28,000	2×20 mm	Practice bombs	This type developed from Firefly I. Trainer version of Mk.5 available.
134 sea level	I.R.C. 900ft/min	383	17,300	Nil	Nil	Version with Blackburn Cirrus Major 3 has max speed of 141 m.p.h.
585 sea level	30,000 5.7	See Remarks	46,000	Nil	Nil	Max range with drop tank is 820 miles.
445 20,000	20,000 5.65	See Remarks	Over 40,000	2×20 mm	2×1000-lb bomb or 12 R.P.s	British Naval version is Sea Fury T. Mk.20, to which data apply. Max range 1,630 miles.
150 sea level	I.R.C. 700ft/min	485	17,500	—	—	Fitting of Gipsy Queen 51 engine improves performance, the maximum speed being 168 m.p.h. at 6,800ft.
160 sea level	I.R.C. 1,100ft/min	460	17,700	Nil	Nil	Provision for auxiliary ventral tank. To be used for research.
393 20,000	R.O.C. at 7,000ft is 4,570ft/min	500	40,600	4×0.303in	Provision for bombs or R.P.s	Data apply to conversion of Spitfire Mk.8.

PISTON ENGINES

(Compiled by "Flight." Copyright)

Maker's Name and Engine Type	Arrangement of Cylinders	Cooling	Bore × Stroke in	Capacity litres	Max. Power Rating				Recommended Economical Cruising Power				Fuel Consumption R.E.C.P. G.P.H.	Take-off Power	Dry Weight (lb)	Notes
					b.h.p.	r.p.m.	Boost lb/sq in	ht. (ft)	b.h.p.	r.p.m.	Boost lb/sq in	ht. (ft)				
Alvis :																
Leonides 501/1 to 501/4 (Mks. XI to XIV)	9 R	A	4.80×4.41	11.78	440	2,900	+3	8,750	320	2,600	0	11,750	21	520	760–790	Mk. according to reduc. gear and accessory arrangements.
LE.21.HM ...	9 R	A	4.80×4.41	11.78	440	2,900	+3	8,750	320	2,600	0	11,750	21	520 550	670 770	Helicopter power plants.
WS.51.L ...	9 R	A	4.80×4.41	11.78	440	2,900	+3	8,750	320	2,600	0	11,750	21	520	770	
Armstrong Siddeley :																
Cheetah 15 and 25.	7 R	A	5.25×5.5	13.67	405	2,425	2.75	4,000	260	2,100	0	S.L.	17	420 475	805	Max. W.M. consumption for R.E.C.P.
Blackburn :																
Cirrus Minor II	4 IL	A	3.93×4.99	3.99	100	2,600	—	S.L.	80	2,200	—	S.L.	4.9	100	234	
Cirrus Major III	4 IL	A	4.72×5.51	6.33	155	2,450	—	S.L.	125	2,100	—	S.L.	8.0	145	333	
Bombardier ...	4 IL	A	4.8×5.5	6.52	180	2,600	—	S.L.	142	2,200	−2	3,300	7.25	180	340	Fuel injection.
Grenadier ...	6 IL	A	4.8×5.5	9.79	310	2,500	+5	2,500	236	2,400	+1	8,000	16.0	300	540	Fuel injection.
Bristol :																
Bristol 101 ...	14 R	A	5.75×6.5	38.7	M.S.1,800 F.S.1,625	2,800 2,800	8.25 8.25	9,000 19,500	M.S.1,215 F.S.1,125	2,400 2,400	2.5 2.5	12,250 21,000	72.1 71.0	1,675	2,045	R.E.C.P. for all power units is Max. W.M.
Hercules 120 ...	14 R	A	5.75×6.5	38.7	M.S.1,790 F.S.1,460	2,800 2,800	7.5 7.5	5,500 22,500	M.S.1,220 F.S.1,080	2,400 2,400	3.0 3.0	9,750 24,250	71.1 70.4	1,715	2,070	High cruising altitude.
Hercules 630 ...	14 R	A	5.75×6.5	38.7	1,705	2,800	7.5	7,750	1,300	2,400	3.25	9,750	77.6	1,600	1,930	Civil unit (R.E.C.P. for Wayfarer a/c special case).
Hercules 672 ...	14 R	A	5.75×6.5	38.7	1,780	2,800	8.0	6,500	1,320	2,400	3.75	8,500	76.6	1,690	1,940	
Hercules 230 and 730.	14 R	A	5.75×6.5	38.7	1,925	2,800	11.5	5,000	1,205	2,400	4.0	10,500	72.2	1,850	2,060	Military Unit 230 Civil 730.
Hercules 762 ...	14 R	A	5.75×6.5	38.7	M.S.2,100	2,900	15.5	4,000	M.S.1,225 F.S.1,125	2,400 2,400	4.0 4.0	12,250 22,500	73 72.6	2,040	2,300	
Centaurus 18 ...	18 R	A	5.75×7.0	53.6	M.S.2,550 F.S.2,280	2,700 2,700	9.5 9.5	4,000 16,500	M.S.1,745 F.S.1,600	2,400 2,400	2.5 2.5	11,000 21,250	105.6 104.1	2,470	2,890	Water/Methanol for T.O. and max. power.
Centaurus 20 ...	2×18 R	A	5.75×7.0	53.6	M.S.5,100 F.S.4,560	2,700 2,700	9.5 9.5	4,000 16,500	M.S.3,490 F.S.3,200	2,400 2,400	2.5 2.5	11,000 21,250	211.2 208.2	4,940	5,140	Two coupled 57s (without water/methanol).
Centaurus 57 ...	18 R	A	5.75×7.0	53.6	M.S.2,820 F.S.2,600	2,700 2,700	11.5 11.5	500 14,250	1,745 1,600	2,400 2,400	2.5 2.5	11,000 21,250	105.6 104.1	2,810	2,800	Water/methanol
Centaurus 130 and 630.	18 R	A	5.75×7.0	53.6	2,680	2,700	10.75	4,000	1,805	2,400	3.25	9,500	105.3	2,600	3,020	Military Unit 130 Civil 630.
Centaurus 660...	18 R	A	5.75×7.0	53.6	2,820	2,900	10.5	5,500	M.S.1,950 F.S.1,720	2,400	1.5	13,250 21,000	107 111	2,700	3,270	
De Havilland :																
Gipsy Major 10	4 IL	A	4.64×5.51	6.12	145	2,550	—	S.L.	115	2,300	−2	5,000	8	145	312	
Gipsy Major 30	4 IL	A	4.74×5.906	6.78	160	2,500	—	S.L.	118	2,100	—	3,500	7.5	160	340	
Gipsy Major 50	4 IL	A	4.74×5.906	6.78	197	2,500	+5	S.L.	121	2,100	−1	11,500	8	197	410	
Gipsy Queen 30	6 IL	A	4.74×5.906	10.18	250	2,500	—	S.L.	181	2,100	−2	3,500	12	250	510	
Gipsy Queen 50	6 IL	A	4.74×5.906	10.18	295	2,500	+5	S.L.	182	2,100	−1	1,200	11.5	295	560	
Gipsy Queen 70	6 IL	A	4.74×5.906	10.18	345	2,800	+6	7,750	265	2,400	+2	7,750	17	345	660	Geared.
Jameson ...	4 HO	A	4.125×3.75	3.28	106	3,050	—	S.L.	93	2,800	—	—	4.8	106	244 290	Wt. less helicopter transmission.
Monaco ...	4 HO Flat	A	4.375×3.625	3.6	100	2,800	—	S.L.	70	2,300	—	S.L.	4.5	100	230	Installed weight.
Napier :																
Sabre 5A ...	24 H horiz.	L	5.0×4.75	36.7	M.S.2,615	3,850	15	2,500	890	2,500	5	11,500	56.7	2,310	2,490	Best specific consumpt. stated.
Sabre 7 ...	24 H horiz.	L	5.0×4.75	36.7	M.S.3,055 F.S.2,820	3,800 3,850	17.25 17.25	2,250 12,500	900	2,500	5	11,750	55.7	3,000	2,560	Mk. 7 with water/methanol.
Rolls-Royce :																
Merlin 35 ...	12 V	L	5.4×6.0	27	1,240	3,000	9	11,500	755	2,100	4	6,750	68	1,280	1,520	1-speed, 1-stage.
Merlin 140 ...	12 V	L	5.4×6.0	27	M.S.1,780 1,980 F.S.1,650 1,830	3,000 3,000 	20 25* 20 25*	4,500 S.L. 16,750 13,000	M.S.1,200 F.S.1,185 	2,650 2,850 	9 9 	10,250 23,750 	79 89 	1,725	1,780	2-speed, 2-stage contraprop.
Merlin 500 ...	12 V	L	5.4×6.0	27	M.S.1,635 F.S.1,510	3,000 3,000	18 18	2,250 9,250	M.S.1,080 F.S.1,015	2,650 2,650	7 7	8,750 15,500	71.5 71	1,610	1,540	2-speed, 1-stage Max. cont. cruising for R.E.C.P.
Merlin 620–624	12 V	L	5.4×6.0	27	M.S.1,780 F.S.1,655	3,000 3,000	20 20	4,500 16,750	M.S.1,180 F.S.1,165	2,650 2,850	9 9	10,500 23,750	76 84	1,725	1,740	2-speed, 2-stage.
Griffon 57 ...	12 V	L	6.0×6.6	36.7	M.S.2,005 F.S.1,830	2,750 2,750	18 18	1,500 9,750	M.S.1,390 F.S.1,195	2,400 2,400	9 9	6,500 12,750	88 86	2,450	2,020	Contraprop. Water/methanol.
Griffon 74 ...	12 V	L	6.0×6.6	36.7	M.S.2,100 F.S.2,140	2,750 2,750	18.5 25	S.L. 9,250	M.S.1,315 F.S.1,244	2,400 2,400	7 7	7,750 18,750	84.5 85.5	2,100	2,090	
Griffon 88 ...	12 V	L	6.0×6.6	36.7	M.S.2,035 2,350 F.S.1,820 2,120	2,750 2,750 	18 25* 18 25*	7,000 1,250 21,000 16,000	M.S.1,305 F.S.1,215 	2,400 2,400 	7 7 	12,250 25,000 	86 91 	1,935	2,150	Contraprop.
Eagle	24 H	L	5.4×5.125	46	M.S.3,500 F.S.3,020	3,500 3,500	21 21	3,250 15,250	M.S.2,320 F.S.2,180	3,100 3,100	9 9	10,250 20,000	157 161	3,415	4,220	Sleeve valves. Contraprop.

Abbreviations :—*Cylinder Arrangements*, R = Radial, IL = Inverted in line, H.O. = Horizontally opposed, H = H-form layout, V = Vee-form layout. *Cooling*, A = Air. L = Liquid. *Supercharging*, L.S. = Low. M.S. = Medium, F.S. = Fully or High, S.L. = Sea level. * = 100/150 grade fuel.

GAS TURBINES

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Maker's Name and Engine Type	Type of Compressor	No. of Combustion Chambers	Max. Power Rating (Sea Level Static) Thrust lb.	Shaft h.p.	r.p.m.	Recommended Economical Cruising Power (R.E.C.P.) Thrust lb.	Shaft h.p.	r.p.m.	Speed (m.p.h.) and Ht.	Specific Fuel Consumption (lb/b.h.p./hr. or lb/hr/lb)	Diam. and Length in.	Dry Weight lb.	Notes
Armstrong Siddeley :													
Python	A	11	1,150	3,670	8,000	950	2,720	7,600	S.L. Static	0.78	48 & 96	3,150	Weight with intakes but not airscrews.
Mamba	A	6	307	1,010	15,000	102	918	14,000	300 at S.L.	0.82	29.56 & 57	760	Length without jet pipe.
Bristol :													
Theseus	A, IC	8	590	2,200	8,200	330	960	8,200	300 at 20,000	0.85	49 & 82.6	1,860	Weight includes intakes, heat exchanger and mounting.
Proteus	A, IC	8	800	3,200	10,000	—	—	—	—	—	38.5 & 99.75	2,900	
De Havilland :													
Goblin 2	IC	16	3,000	—	10,200	1,850	—	8,700	S.L. Static	1.25	49.85 & 100.5	1,550	Weight including tail pipe, nozzle, etc., excluding a/c. auxiliaries.
Goblin 3	IC	16	3,300	—	10,750	2,240	—	9,500	S.L. Static	1.18	49.85 & 100.5	1,573	
Ghost	IC	10	5,000	—	10,000	2,825	—	8,500	S.L. Static	1.06	53 & 115.5	2,011	
Metropolitan-Vickers :													
Metrovick Beryl	A	Ann.	3,850	—	7,750	3,400	—	7,400	S.L. Static	1.42	48.2 & 161.5	1,785	Consumpt. at 500 m.p.h. at S.L.
Metrovick F.3 ...	A	Ann.	4,600	—	7,390	3,900	—	—	S.L. Static	0.65	46 & 140	2,300	Ducted fan.
Metrovick F.5 ...	A	Ann.	4,710	—	7,700	2,300	—	—	400 at 20,000	0.66	37.25 & 146.5	2,200	Open fan augmentor.
Napier :													
Naiad	A	5	241	1,500	18,250	182	978	17,000	S.L. Static	0.69	28 & 102	1,095	Weight less airscrew.
Rolls-Royce :													
Derwent V ...	IC	9	3,600	—	14,700	2,675	—	13,600	S.L. Static	1.04	43 & 83.1	1,280	
Nene I	IC	9	4,500	—	12,000	3,500	—	11,200	S.L. Static	1.04	49.5 & 96.8	1,640	
Nene II	IC	9	5,000	—	12,300	4,000	—	11,600	S.L. Static	1.04	49.5 & 96.8	1,750	
Clyde	A, IC	9	1,225	3,020	6,000	—	—	—	—	—	46.72 & 121.2	2,800	Weight less airscrew.
Dart	2C	7	325	1,000	—	—	—	—	—	—	32 & 98	1,075	As for Viscount.

Abbreviations :—Compressors, A = Axial. IC = Single-stage centrifugal. Ann = Annular combustion chamber. S.L. = Sea level.

BATTLE OF BRITAIN FLY-PAST

Over Two Hundred Aircraft Engaged

LARGE areas of South-East England and of the North Midlands will see something of this year's Battle of Britain fly-past of the Royal Air Force on Wednesday, September 15, when well over 200 aircraft will fly from their bases over Central London and back again by widely separated routes. A rehearsal of wing leaders and deputies took place on August 26th.

Zero hour for the actual fly-past is 12.30 p.m. and the Zero line joins Charing Cross Road, Trafalgar Square and Whitehall. Among the towns which will be flown over are Great Yarmouth and Lowestoft, Ipswich and Clacton-on-Sea in the east, Manchester, Leicester, Leeds, Sheffield, Peterborough, Northampton, Coventry and Birmingham in the Midlands, High Wycombe, Oxford, Reading, Basingstoke, Winchester and Salisbury in the west, and Portsmouth, Aldershot, Lindford, Redhill, Maidstone, Ashford, Haywards Heath, Horsham, Midhurst, Petersfield, and the entire Kent, Surrey and Hampshire coast-line as far west as Southampton. Cowes, Newport and Ventnor, I.O.W. will also be on the route of one of the wings. The twelve wings converge on East London in the Hornchurch area and after crossing the zero line, will maintain their track for one mile to take them along the Mall before turning on their outward courses. As in previous years, a single Hurricane will take part.

Aircraft engaged, their routes, and times due over Trafalgar Square, are as follows:—

Group 1.—15 Vampires. Redhill, Grays, Hornchurch, Charing Cross (12.30 p.m.).

Group 2.—12 Hornets. Clacton, Southend, Hornchurch, Charing Cross (12.34 p.m.), St. Albans, Luton and Bedford.

Group 3.—U.S.A.F. Shooting Stars (details to be announced later). Charing Cross (12.38 p.m.).

Group 4.—20 Meteor 4s. Brighton, Maidstone, Chatham, Hornchurch, Charing Cross (12.42 p.m.). They then divide into two groups, one going to Leatherhead and Horsham, the other to Hatfield, Stevenage, Royston, Cambridge and Duxford.

Group 5.—15 Meteor 4s. Haywards Heath, Gravesend, Hornchurch, Charing Cross (12.46 p.m.), Guildford, Haslemere, Petersfield and Portsmouth.

Group 6.—15 Meteor 4s. Ipswich, Colchester, Chelmsford, Hornchurch, Charing Cross (12.50 p.m.), Hertford, and Bishop's Stortford.

Group 7.—18 Mosquitoes (six from Germany). Lewes, Newhaven, Eastbourne, Dover, Deal, Herne Bay, Sittingbourne, Hornchurch, Charing Cross (12.54 p.m.), Caterham, Reading, Oxford, Salisbury and Selsey Bill.

Group 8.—15 Mosquitoes. Yarmouth, Lowestoft, Ipswich, Maldon, Hornchurch, Charing Cross (12.58 p.m.), Watford, Leighton Buzzard, Northampton and Peterborough.

Group 9.—12 Tempests (from Germany). Ramsgate, Margate, Eastchurch, Colchester, Braintree, Brentwood, Hornchurch, Charing Cross (1.02 p.m.), Great Dunnover, Maldon, Southend, Canterbury, Hythe, Dover and Deal

Group 10.—18 Spitfires (Royal Auxiliary Air Force). Redhill, Midhurst, Selsey Bill, Brighton, Eastbourne, Lydd, Dover, Canterbury, Nore Lightship, Canvey Island, Hornchurch, Charing Cross (1.06 p.m.) they then divide into two, one going to Hendon and the other to Biggin Hill, via Orpington.

Group 11.—Naval Aviation Wing of 6 Sea Hornets and 6 Firebrands. Cowes, Newport, Ventnor, Littlehampton, Ashford, All Hallows, Hornchurch, Charing Cross (1.10 p.m.), Rickmansworth, Reading, Basingstoke, Winchester, Southampton and Calshot.

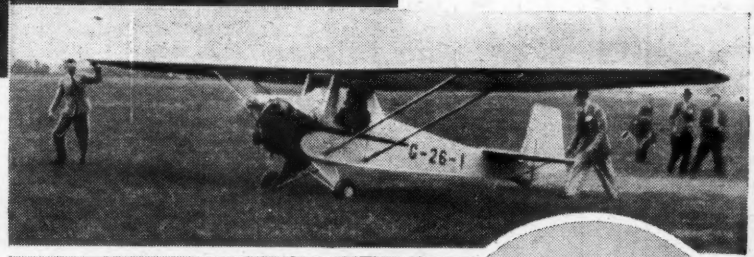
Group 12.—Composite Heavy force of 12 Lincolns, 15 Lancasters and 6 Halifaxes. Southend, Hornchurch, Charing Cross (1.14 p.m.). This force, followed by the lone Hurricane, then circuits south, east, north and north-west London, then over Watford, High Wycombe, Coventry, Birmingham, Wolverhampton, Stoke, Manchester, Bradford, Leeds, Sheffield, Derby, Leicester, Peterborough, and then break off for their bases.

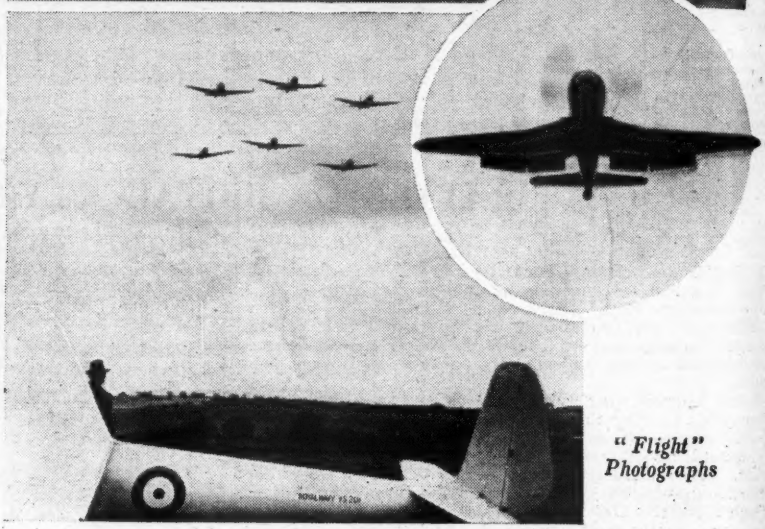
ENGINE REPLACEMENT SERVICE

A NEW engine replacement service has been announced by the de Havilland Engine Service Department for operators of any Gipsy engines of types no longer in production but still in use. The scheme has been in operation for some months for the Gipsy Queen Series 70 engine, but the new service will now embrace all of the Gipsy Major 1 series and the later versions of the Gipsy 6, now known as the Gipsy Queen 2 and 3. The de Havilland Engine Service Department will merely require to know when an engine of those types is approaching the time for a complete overhaul in order to arrange for an overhauled engine of the same mark to be ready as immediate replacement. Replacement engines will have been overhauled by Gipsy engine specialists, and will incorporate all the essential modifications up to the date of installation. Each engine will carry the same warranty as given by the company as manufacturers with each new engine, providing free service and free replacement if necessary, during that period. Operators will be able to assess accurately their annual costs, which will not be dependent upon charges for specific replacements which become apparent only in the event of overhaul. The scheme is unique in accepting old engines at a fixed price, regardless of condition, and providing a reconditioned engine with guarantee. Charges are as follows: Gipsy Major 1, £150; Gipsy Queen 2, £225; Queen 3, £225; and Queen 70, £600.

East Yorks Air Meeting

Scenes from the Brough Display





The line-up of Austers for the Cirrus Trophy contest and the two winners are seen above, and (right) is the formation of Firebrands, the Slingsby Motor Tutor and the S.28/43

"Flight" Photographs

A DESCRIPTION of the Brough Air Display and Garden Party, which took place on August 21st, was given in *Flight* last week on page 246. The selection of photographs above gives an indication of the variety of the events seen by the six thousand or so spectators who attended from the Hull area. The winners of the Cirrus Trophy competition were F/L. J. R. Saunders and Mr. V. Gordon-White. They are seen above with their winning Auster, number 11, which is owned by the East Riding Club at Speeton. The Firebrands, which are about to demonstrate carrier fly-off and landing technique, also gave a polished display of formation flying. The Slingsby Motor Tutor and a demonstration of sailplane handling provided popular events in contrast to the high-speed demonstrations. Blackburn's chief test pilot, Mr. P. G. Lawrence, showed off the recently completed second prototype S.28/43 in a most convincing manner, and his rapid rolls and, on two occasions, five consecutive climbing rolls, delighted all the spectators, particularly those who had had a hand in building this naval strike aircraft.

BRABAZON CONSTRUCTION COSTS

REPLIES by the Ministries of Supply and Civil Aviation to certain of the conclusions and recommendations of the Report of the Select Committee on Estimates have been published. With regard to forecasting the date for completion, it was considered that since it is difficult to forecast such a date for a conventional type of aircraft, to make a forecast for one of the size and novelty of the Brabazon I was even more hazardous. The original date and subsequent changes were fixed in agreement with the constructors, and at a review of progress made in 1947 it was considered that the Mark II prototype would be ready for first flight by August, 1950. In reply to the criticism that neither project was included in the Prime Minister's priority list, it was stated that it would have been inappropriate to include them in the list which was promulgated as a result of the fuel crisis in early 1947, and which gave precedence to projects for increasing supplies of coal, gas and electricity. Priority for labour and materials would not have been justified, nor would it necessarily have assisted development, since progress depended mainly upon the solution of problems by designers and technicians.

Both Ministries welcomed the Committee's recommendations that every step should be taken to expedite completion of both projects and to ensure immediate production if they should be successful. The Report refers to the statement by the Minister of Civil Aviation that the government was not entirely satisfied with the existing procedure for ordering aircraft. The report of a Committee formed to enquire into the procedure had been received and was under consideration. The department accepted the Committee's recommendation that no attempt should be made to recover from B.O.A.C. the full cost of the Brabazon I Mark II prototype if and when it was handed over for operational service.

The Air Exercises

U.S.A.F. and R.Aux.A.F. to Co-operate with Royal Air Force

A FOUR-DAY air exercise will open at 1 p.m. on Friday, September 3rd. The biggest since the war, it will mark the climax to a year's training and will embrace all home operational commands of the R.A.F., including R.Aux.A.F. units, as well as American bomber squadrons already stationed in the U.K. The general idea of the exercise imagines an enemy continental power called "Southland" with a western coastline joining Basle, in Switzerland, to the Dutch Island of Juist and thence northward to a point about halfway up the Norwegian coast. "Southland" has issued an ultimatum to "Northland" (an area which includes the Midlands, East Anglia and south-east England) which expires at noon G.M.T. on September 3rd. Reports will indicate that there is no possibility of "Northland" acceding to "Southland's" demands and a declaration of war is expected on the same day. The ultimatum will have been received by 10 a.m. on September 1st, and in the event of hostilities, the main bomber attacks are expected to be directed against objectives in the London area. In accordance with a pre-arranged plan, all "Northland's" air and ground defences will be ready by September 2nd.

In command of the attacking forces will be the Air Officer Commanding-in-Chief Bomber Command (Air Marshal A. B. Ellwood) and "Northland's" air forces will be under the A.O.C.-in-C. Fighter Command (Air Marshal Sir William Elliot). The "enemy" forces will include not only bombers but also Coastal Command units as detailed by the A.O.C.-in-C., Coastal Command (Air Marshal Sir Leonard Slatter), Flying Training Command units as ordered by the A.O.C.-in-C. Flying Training Command (Air Marshal Sir Ralph Cochrane), American bomber units as ordered by the Commanding General, U.S.A.F.E. (General Curtis Lemay), aircraft from the British Air Forces of Occupation in Germany, as ordered by the A.O.C.-in-C (Air Marshal Sir Arthur P. M. Sanders), Yorks and Dakotas from Transport Command, R.A.F., as ordered by the A.O.C.-in-C. (Air Marshal Sir Brian E. Baker) and Hornet aircraft from Fighter Command. Lincolns, Lancasters, Mosquitos and Wellingtons will be among the other types of aircraft used by "Southland."

"Northland's" air defence forces will comprise all first-line squadrons of Fighter Command (except the Hornets operating for "Southland"), Fighter Command control and reporting system, including radar reporting stations and the Royal Observer Corps, operational flights of the Royal Auxiliary Fighter Squadron (as ordered by the A.O.C.-in-C., Reserve Command, Air Marshal Sir Alan Lees), anti-aircraft units (as ordered by the G.O.C.-in-C. A.A. Command, Lieutenant-General Sir G. Ivor Thomas) and civil defence forces as ordered by the Home Office.

All operations will be controlled by the Deputy Chief of Air Staff, Air Marshal Sir Hugh S. P. Walmsley, located at H.Q. Fighter Command, who will issue directions and information to Commanders-in-Chief. He will be assisted by a staff of senior officers from Air Ministry and Headquarters Staffs of Coastal and Reserve Commands located at lower formations and units.

SIR R. SORLEY'S NEW POST

AFTER a very distinguished career in the Royal Air Force, Air Marshal Sir Ralph S. Sorley, K.C.B., O.B.E., D.S.C., D.F.C., is retiring from the Service and is joining the board of directors of de Havilland Propellers, Ltd., as chief executive.

Sir Ralph Sorley.

Sir Ralph Sorley has been closely associated with the technical side of the R.A.F. and, after periods overseas, he concentrated on the development of aircraft, becoming Assistant Chief of the Air Staff (Technical Requirements) in 1941. From 1943 to 1945 he was Controller of Research and Development at the Ministry of Aircraft Production, and for several years he was a member of the Air Council. Sir Ralph will have his headquarters at the Hatfield establishment of de Havilland Propellers, Ltd., and will take up his new appointment at the end of this year.

MAMBA'S FIVE HUNDRED HOURS

BRITISH turbojet and turboprop units go from strength to strength in displaying their powers of endurance and their ability to maintain performance over long periods. In the news this week is the Armstrong Siddeley Mamba turboprop which, having run since July 19th, was shut down at 11 a.m. on August 23rd by Mr. H. T. Chapman, Director and General Manager of Armstrong Siddeley. Five hundred hours of sealed running had been completed with nothing more than minor servicing, under the supervision and control of the Air Registration Board.

The five-hundred-hour period comprised 34 phases of five-hours' duration, and 33 of ten hours. Each five-hour period consisted of: initial starts, idling, taxying and acceleration (18 min); maximum take-off (3 min); maximum cruise (30 min); 70 per cent take-off power (60 min); 65 per cent take-off power (60 min); 60 per cent take-off power (60 min); 60 per cent take-off power (60 min); 58 per cent take-off power (60 min); final accelerations, taxying, etc. (9 min). Each ten-hour period consisted of two of the above periods. Over 70,000 instrument readings were recorded during the test, during which the compressor and turbine turned through some 370,000,000 revolutions.

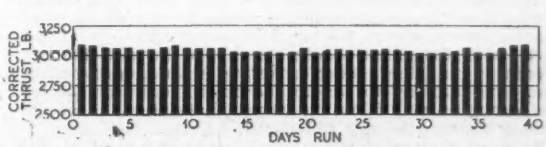
The Mamba has now completed 5,000 hours of development running; a 500-hour endurance test; a 150-hour civil and military Type Test; and 100 hours flying in a Lancaster flying test bed and in the Boulton-Paul Balliol and Avro Athena trainers, both of which are due to appear at the S.B.A.C. Display. Mambas have also been selected to power the Armstrong Whitworth Apollo medium transport, described in *Flight* of August 26th, and may soon be expected to appear in new prototypes.

GOBLIN MAKES HISTORY

RECORDED in *Flight* of August 19th was an endurance test of a Goblin turbojet—part of a programme instigated by Sir Alec Coryton, Controller of Supplies (Air)—during which this great little de Havilland turbojet completed 234 test cycles, each of 65 minutes duration, separated by ten-minute non-running intervals. Now comes the splendid news that after 28 days of all-out running under the most severe and violently fluctuating conditions of fighter operation, the same unit has been allowed to run on to double the test period. During its seven weeks' ordeal the Goblin, in effect, made a dozen operational flights daily at ten-minute intervals, with, as the makers put it, "hardly any servicing at all." The burners were changed as a precaution at 303 hours because the filters, which had to handle 161,000 gallons of paraffin from underground tanks, naturally became clogged. One minor accessory drive, which did not affect the running of the unit, was replaced after 308 hours. In fact the only attentions required occupied a mere 13.2 man-hours of work in more than 500 hours of running.

Perhaps the most astonishing revelation of the test is that periodic readings up to the very last run showed, without a single exception, that the performance of the unit was equal to that of a new engine. Thus, with no adjustment, the same unit could pass the R.A.F. acceptance test.

The whole British aircraft industry will join in congratulating the de Havilland Enterprise on this most meritorious achievement.



Day-to-day thrust figure for the Goblin.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

FLYING-BOAT OPERATION

Special Marine Corporation Wanted

MAY I suggest that a new alignment of the nationalized air transport corporations should be considered, so that, instead of only being divided up into geographical spheres of operation, they be divided (or sub-divided) according to whether they operate land or sea-going aircraft. In other words, let us have a special corporation to operate flying-boats.

In the Saro 45 (please, Saunders-Roe, give it a name soon, instead of a number like a convict) we shall have a transport which can give a lead to all the world. No expensive and rare runways are required for it; only harbour facilities are needed, which could be developed reasonably cheaply wherever there is water. A certain sum of money will be needed to develop these, the cost of which will be small compared with the cost of runways and airfields. But a marine aircraft corporation is needed to develop these on a world-wide scale.

London, W.1. GEOFFREY DORMAN.

AIRSHIP TRANSPORT

Has it a Place in Modern Times?

IN all recent discussions in this journal on the future mode of air transport, the main issue seems to be "flying boat versus landplane." No mention is made of that seemingly forgotten machine, the airship.

Admittedly, in the past the record of these machines has in many cases been one of tragic failure, but surely, with the use of helium gas and the advantage of present-day power and navigational advancements, many of these accidents would never have occurred.

I imagine, of course, that the cost of building them would be far greater than that of a large landplane, but would this not be amply offset by the far greater payload that would follow?

In conclusion, I must say that my assumptions are not based on any great technical knowledge, and I would therefore appreciate it if any of my fellow readers could make any constructive comment, for or against, upon them.

Willesden Green, N.W.2. DENIS B. HAMPSON.

R.A.F.V.R. TRAINING

Greater Flexibility Needed

THE question of ground training in the R.A.F.V.R. is one to which the authorities should give second thoughts. To say that those members who fail to attend lectures are not fulfilling their obligations is tantamount to declaring that only those who live in close proximity to their training centre should consider joining the V.R. The primary object of the scheme is, surely, to keep in flying practice as large a body of potential wartime aircrew as possible. Many who live at a distance can put in the necessary number of flying hours by reason of being able to choose their own time (and this applies to Link training as well), whereas they cannot attend ground training which must necessarily be organized at given times.

Let it be remembered that flying practice is the really essential part of the scheme; in the present condition of the world, everything should be done to encourage as many as possible to join the V.R., and the one essential qualification should be ability to do the appropriate amount of flying.

I should also like to put in a plea for greater flexibility in the organization of the V.R. I happen to be a master at a boarding school, which means that I spend the terms in one part of the country and the holidays in another, and it ought to be possible for me to put in my training at the two centres nearest my home and school respectively. I understand, however, that this is impossible without transferring from one station to the other, a procedure which is obviously impractical for such short periods. It should be possible for one to be on the strength of one centre and yet be able to carry out a portion of one's training at a second centre in such circumstances. Such an arrangement would benefit many. H. F.

Swansea.

HOLLAND'S AIR FORCES

Training and Equipment

PLEASE accept my congratulations on the clear and favourable article about the Dutch Air Forces published in *Flight* of August 5th.

I would like, however, to point out two slight errors:

1. You state that the Army Air Corps undertakes all training (including training of Naval personnel) under the guidance of the Directorate of Flying training (page 159, first column). This Directorate of Flying training, which recently was renamed Command of Aviation Training, however, is a joint Command formed by Navy and Army. The Officer Commanding is at present a Commander R.Neth.N.

2. The Army Air Corps equipment appears to include North-American Mitchells. These Mitchells formed the equipment of 320 (Dutch) Squadron R.A.F. 320Sq. was a Squadron manned by the Netherlands Navy, including attached Army Air Corps personnel.

Recently the Mitchells were collected in England by the Navy and now form part of the equipment of the *Naval* Air Service.

K. J. F. KREDIET,
Commander R.Neth.N.,
Naval Attaché.

Netherlands Embassy,
London, W.1.

FORTHCOMING EVENTS

Sept. 4th.—Northants Aero Club: Air display at Sywell. (Cancelled.)
Sept. 4th.—Butlin's Week-end Air Rally, Speeton, Filey, Yorks.
Sept. 4th.—Bristol and Wessex Aeroplane Club: Air display, Whitchurch airfield, Bristol.
Sept. 5th.—Light aircraft rally and model flying meeting, Flers, France.
Sept. 7th to 12th.—S.B.A.C. Exhibition and Display, Farnborough airfield, Hants.
Sept. 12th.—Royal Air Forces Association: Festival of the Battle of Britain at the Royal Albert Hall.
Sept. 18th to Oct. 3rd.—Copenhagen Show, organized by the F.B.I.
Sept. 18th and 19th.—Aero Club of Milan: Air rally, Forlanini airfield.
Sept. 25th.—S.L.A.E. (South Eastern Area): "Aviation Gasolines," by G. L. Coles, B.Sc., A.R.C.Sc., F.Inst.Pet., Manson House, 26, Portland Place, London, W.1, at 3 p.m.
Sept. 25th and 26th.—Butlin's Week-end Air Rally at Ingoldmells, Skegness.
Sept. 25th and 26th.—International air rally at Cervin, Sion, Switzerland.
Sept. 27th to Oct. 1st.—Fédération Aéronautique Internationale Conference, Paris.
Sept. 30th.—Royal Aeronautical Society: Fourth British Commonwealth and Empire Lecture: "Some Economic Factors in Civil Aviation, with Emphasis on Civil Aircraft and their Prospective Trends of Development." Peter G. Masefield, M.A., F.R.Ae.S.

BUILDING THE SR 45

DESCRIBING, in a series of articles, the construction of the 140-ton Saro SR.45 flying boat, *Aircraft Production* observes that the makers' marine tradition is clearly apparent in the method adopted for hull assembly. From the viewpoint of conventional aircraft practice, the most remarkable feature is that an assembly fixture in the accepted sense of the word scarcely exists, except for the location of frame 51 at the after end of the pressure-hull section. For the rest, the hull is built up on a keel former consisting of a mahogany saddle shaped transversely to receive the bottom curvature of the keel extrusion and following longitudinally the line of the planing bottom, the step and the after body.

Problems that arise in the construction of a boat of this large size (the pressurized section of the hull is 121ft in length) are typified by the fact that checks had to be made of the floor level of the main assembly shop, in case the tidal waters which adjoin the works affected the foundations. These checks established that not only had the floor beeen well and truly laid, but that the subsoil itself was not susceptible to tidal changes—fortunate circumstances both, as in the Saunders-Roe works on the opposite side of the Medina estuary the tides cause appreciable changes in floor level.

BALL AT HEATHROW

LONDON AIRPORT authorities and the airline operating companies are combining to organize a second International Air Ball in the reception building at London Airport on Friday, October 15th, from 8 p.m. till 2 a.m. Tickets, which are £1 1s single, can be obtained from the Honorary Secretary, International Air Ball, c/o Airport Manager, London Airport.

SERVICE AVIATION

"Flight" photograph.

HASTY DEPARTURE: Mr. T. S. Wade, chief test pilot, Hawker Aircraft, Ltd., gets away from his company's airfield for the brilliant demonstration of the N.7/46 Naval jet fighter reported on page 257 of this issue.

Reserve Command Appointment

W/C. G. H. CURRALL, M.M., has been appointed A.T.C. liaison officer at R.A.F. Reserve Command headquarters. W/C. Currall saw service in the R.N.V.R. from 1909 to 1913, the Royal Flying Corps and R.A.F. from 1914 to 1919, and the Royal Observer Corps from 1934 to 1939. He then joined the R.A.F. Volunteer Reserve, in which he served until 1946. Prior to receiving a commission in the R.A.F.V.R. (Training Branch) early this year as flying officer to command the Oxfordshire Wing A.T.C., he served in the Wing as an A.T.C. district inspecting officer in a civilian capacity. He was given the acting rank of squadron leader on taking over command of the Oxfordshire Wing, and the acting rank of wing commander on appointment to Reserve Command in his present capacity.

The Britannia Shield

SEVEN nations, represented by sportsmen from their armed forces, will compete during Battle of Britain week (September 13th to 19th) for the Britannia Shield. This will be the third year of the competition, which is open to nations whose armed forces took part in the Battle of Britain or were assembled in Britain between 1940 and 1945. The shield is made of oak taken from the bomb-damaged Guildhall, London, and the competition is intended to perpetuate the spirit of comradeship which existed between the forces of the allied nations in this country during and after the Battle of Britain.

The nations taking part this year will be Belgium, Czechoslovakia, France, Greece, Holland, Norway and Great Britain, which will be represented by teams from the Royal Air Force. There will be contests in boxing, cross-country running, fencing, shooting and swimming, and the shield will be presented to the nation scoring the highest aggregate number of points. The teams will arrive on September 13th, and will be accommodated at R.A.F. Station, Uxbridge, where they will be officially welcomed at 11 a.m. next day by the Rt. Hon. Arthur Henderson, Secretary for Air, who will be accompanied by the Chairman, Air Chief Marshal Sir Arthur Barratt, and other members of the Britannia Shield Committee. Mr. Ernest Bevin, Secretary of State for Foreign Affairs, will present the shield at the conclusion of the boxing finals in the Empire Pool Arena, Wembley, on Friday evening, September 17th.

The programme for the competition is as follows: *Boxing:* Preliminary bouts at the R.A.F. cinema, Uxbridge, beginning at 9.30 a.m. on September 15th; followed by the semi-finals there, beginning at 7.30 p.m. on the same day. Finals at Wembley on September 17th, starting at 7 p.m. Application for tickets, prices of which are 3s 6d, 6s, 10s 6d and 21s, should be made to Wembley Stadium Ltd., Wembley.

Cross-country running: Over a 5-mile course from R.A.F. Station, Halton, Bucks, on Wednesday, September 15, at 2.30 p.m.

Fencing: At R.A.F. Station, Uxbridge, September 15, beginning at 10 a.m.

Shooting: At Bisley, September 16th, beginning at 10 a.m.

Swimming: At Eltham Baths, September 16th, beginning at 7 a.m.

Profits from the competition will be given to R.A.F. charities. From the profits on last year's competition a sum of money was given to the R.A.F. Benevolent Fund to provide scholarships for assisting children of officers and airmen to receive a university education.

Royal Air Force and Naval Aviation News and Announcements

Secret Signals

RADIO equipment on the secret list was to be installed in the Lincoln *Mercury II*, operated by the R.A.F. Empire Radio School, when it left its base at Debden, Essex, on August 31st, for a six weeks' tour to South Africa, Southern Rhodesia and the R.A.F. Mediterranean and Middle East Command. The aircraft is carrying a R.A.F. signals liaison party of six, headed by G/C. C. M. Stewart, officer in charge of the liaison section at the School, and a crew of eight captained by F/L. R. E. Harrison, one of the flying instructors.

Reunion

A REUNION of No. 221 Squadron Old Comrades' Association will take place in London on October 23rd, 1948. Ladies will be welcome. Tickets (6s 6d) and further details from the Secretary, E. J. McAnulty, 2, Pearl Rd., Walthamstow, London, E.17.

Blackburn S.28/43

IT is reported by one who witnessed Mr. P. G. Lawrence's display of the Blackburn S.28/43 strike aircraft at Brough, on Saturday, August 21st, that the second prototype (more strictly the third, the second having been shelved) appears on the ground to have a pronounced anhedral on the main outer wing panels. This is, however, an illusion occasioned by the swept-back leading-edge and the marked anhedral on that short section of the wing in-

Service Aviation . . . . .

board of the crank. There is, in fact, still three degrees of dihedral. The wing folding is now power operated, the two sections on each side assuming an "arms bend" position when stowed.

A very large spinner is fitted forward of the Centaurus engine and the cowling is extremely neat, cooling being fan assisted. Power-operated controls are another feature, and by virtue of these Mr. Lawrence was able to demonstrate a rate of roll in the region of 120 deg./sec. The first two of five continuous rolls were completed in approximately seven seconds.

Acceleration at take-off was noticeably rapid, and the initial angle of climb very steep indeed. On retraction the wheels are reported to have "fairly snapped up."

Auxiliary Meteors

HALF-WAY through the second week of the summer camp of No. 500 (County of Kent) Squadron, Royal Auxiliary Air Force, at Thorney Island, the weather suddenly "clamped" on their flying programme, which had hitherto been proceeding at a very brisk rate. This interruption—on August 25th—was doubly regrettable because the day had been fixed for a visit by the Rt. Hon. Anthony Eden, M.C., M.P., the Squadron's Honorary Air Commodore. However, four smart, reconditioned Meteor 3s, newly delivered from the Gloster works, were lined up, with the remaining Mosquitoes and the Harvard trainers in the background, and Mr. Eden, who is already familiar with the "Mossies," was able to familiarize himself with the first jet fighters in service with the R.Aux.A.F. S/L. Patrick Green, O.B.E., A.F.C., the commanding officer of No. 500 Squadron, was his guide.

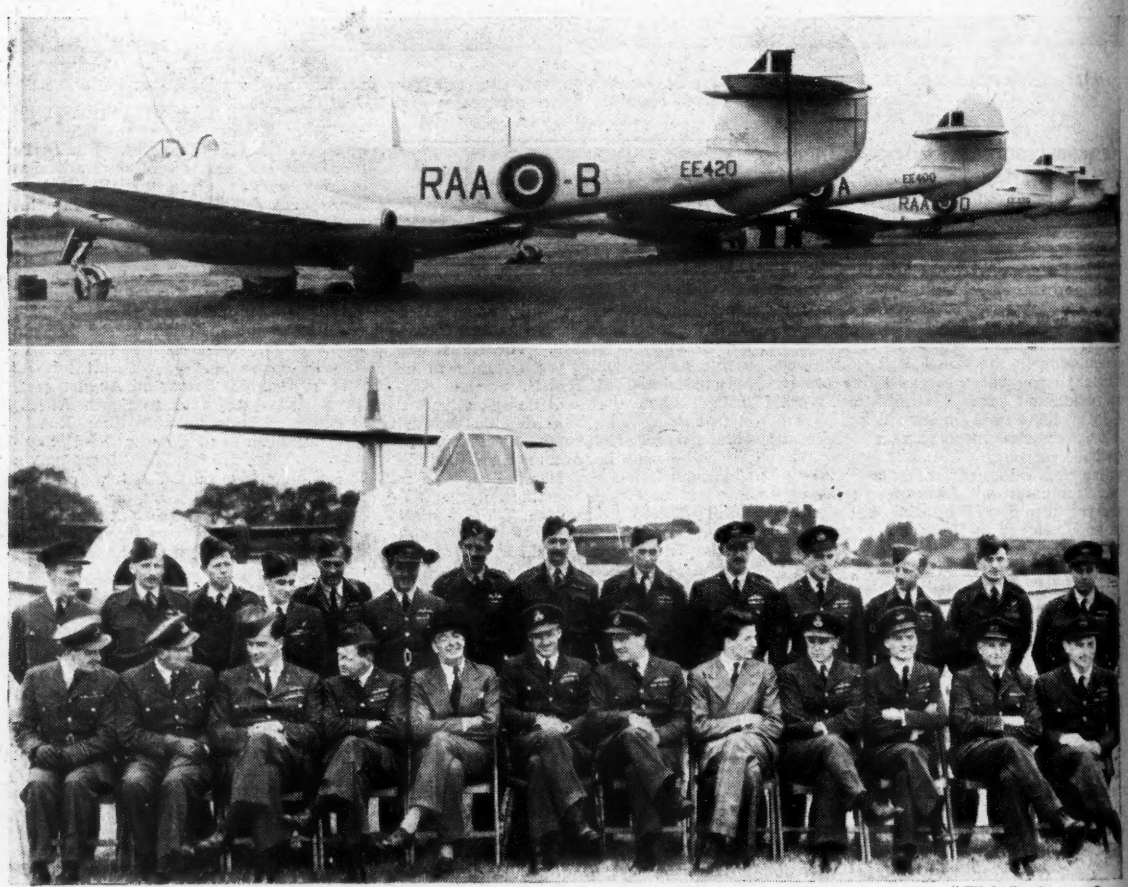
Mr. Eden's visit in no way disrupted the Squadron's training programme, and lectures were in progress as he made his informal tour. It was quite evident that his popularity among the Squadron personnel is not founded solely on the hospitality at his Lavant home. He learned that the full complement of eight Meteors should soon be on hand, and that a flight of four is likely to be seen in the Battle of Britain fly-past. Pilots told him of the ease with which they are converting from the well-loved Mosquitos to the 500-m.p.h. jets, with which they are fast becoming agreeably acquainted. Less happy, perhaps, but none the less keen, were the observers, who having shared the Mosquito cockpits for many a happy and useful hour since the squadron reformed in 1946, must now be found new employment—less congenial, but hardly less important—on the ground. They console themselves with visions of a Meteor 7 arriving one fine day.

From conversation with Mr. Eden one gathered that he is most anxious that next year many, if not all, Auxiliary squadrons should camp abroad—possibly in France. It was he who proposed that one squadron—No. 607—should this year visit Germany.

That men of his calibre should maintain a friendly and active interest in the welfare of the Auxiliary squadrons—of which No. 500 is such an excellent example—is reassuring.

Cadets Meet "Billy" Bishop

THE 25 A.T.C. cadets touring Canada met World War I ace Air Marshal "Billy" Bishop on their arrival at Montreal on Thursday (August 19) after a short flight from Ottawa. Air Marshal Bishop is an honorary president of the Air Cadet League of Canada, which was host to the A.T.C. cadets, now returned.



"Flight" photographs.

KENTISH CAMPERS: That Mr. Anthony Eden and his son enjoyed their call on No. 500 (County of Kent) Squadron, R.Aux.A.F., in camp at Thorney Island, is not to be doubted on examining the group photograph. Mr. Eden, Honorary Air Commodore of the Squadron, inspected the first of the Gloster Meteor 3s (Rolls-Royce Derwent I turbojets) which, before long, will have displaced Mosquitoes as the equipment of the unit. The fuselage markings of the Meteors have the following significance: "R"=Reserve Command; the first "A"=Royal Auxiliary Air Force; the second "A"=No. 500 Squadron (thus No. 501 has the letter "B," and so on, in alphabetical sequence); and the letter aft of the roundel is the individual aircraft letter. A brief report of Mr. Eden's visit appears on this page.